The Eddy: A Model for Resilient Waterfront Regeneration

EcoDistricts Summit 2019; Pittsburgh, PA
Tuesday, November 5, 2018

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Speaker Biography

- Blake Jackson, AIA
- US Northeast Sustainability Design Leader
- Stantec – Boston

- LEED AP 2006
- LEED Faculty 2014
- WELL AP 2016
- WELL Faculty 2016
- Fitwel Ambassador 2016
- EcoDistrict AP 2018
- CPHC 2019
- BD+C “40 Under 40” 2015

Who Are You?

Learning Objectives

- Participants will learn about ***resiliency drivers*** in low-lying and vulnerable coastal urban areas.
- Participants will learn how ***sustainability and resiliency overlap***, using a LEED Gold case study.
- Participants will learn cost-effective ***strategies for mitigating climate change*** risks suitable for all projects.
- Participants will learn ***the ROI for resiliency*** features and how they can be used to support sustainable initiatives.

Agenda

- Introduction to Resiliency Issues
- Context of Resiliency
- Boston Municipal Planning & GIS
- The Eddy – Case Study
- Summary
- Tools and Conclusion

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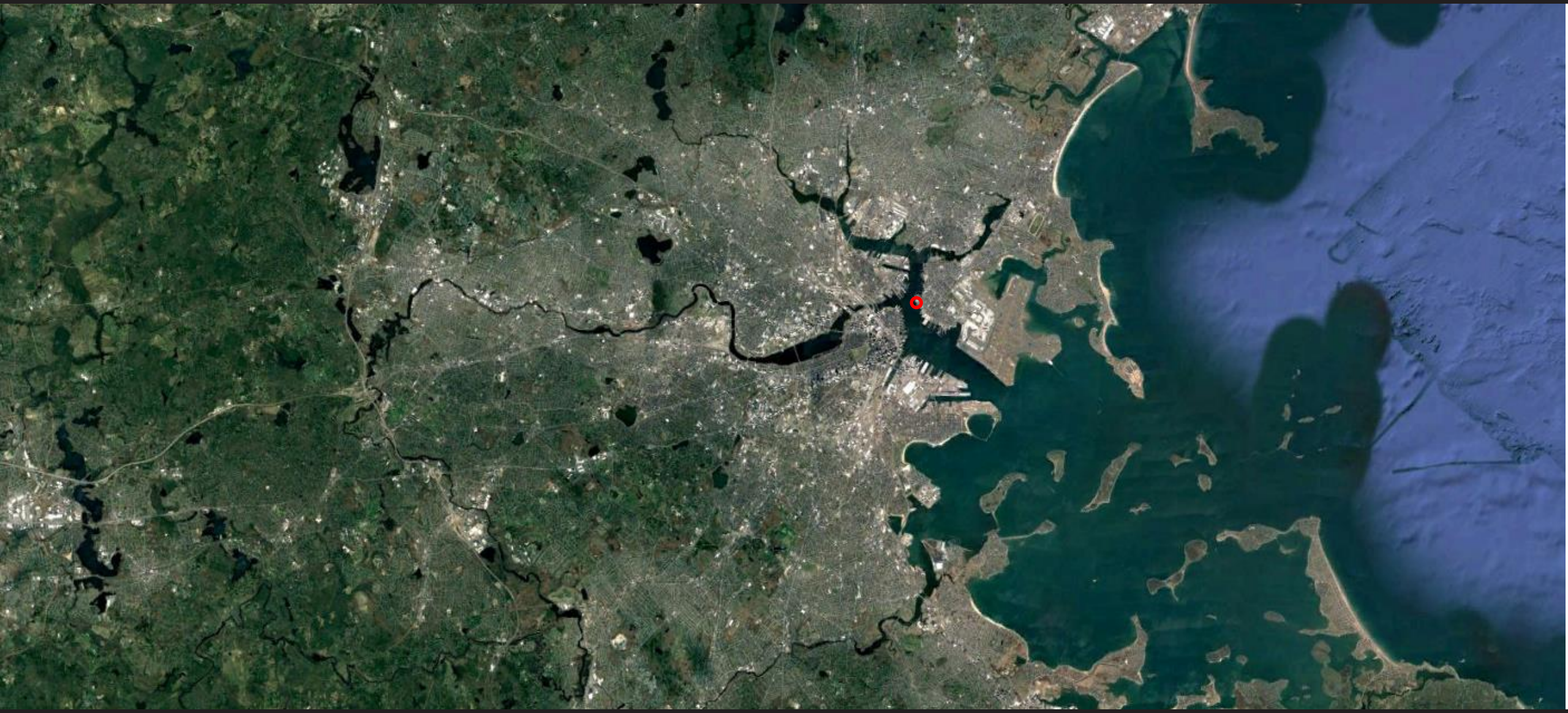
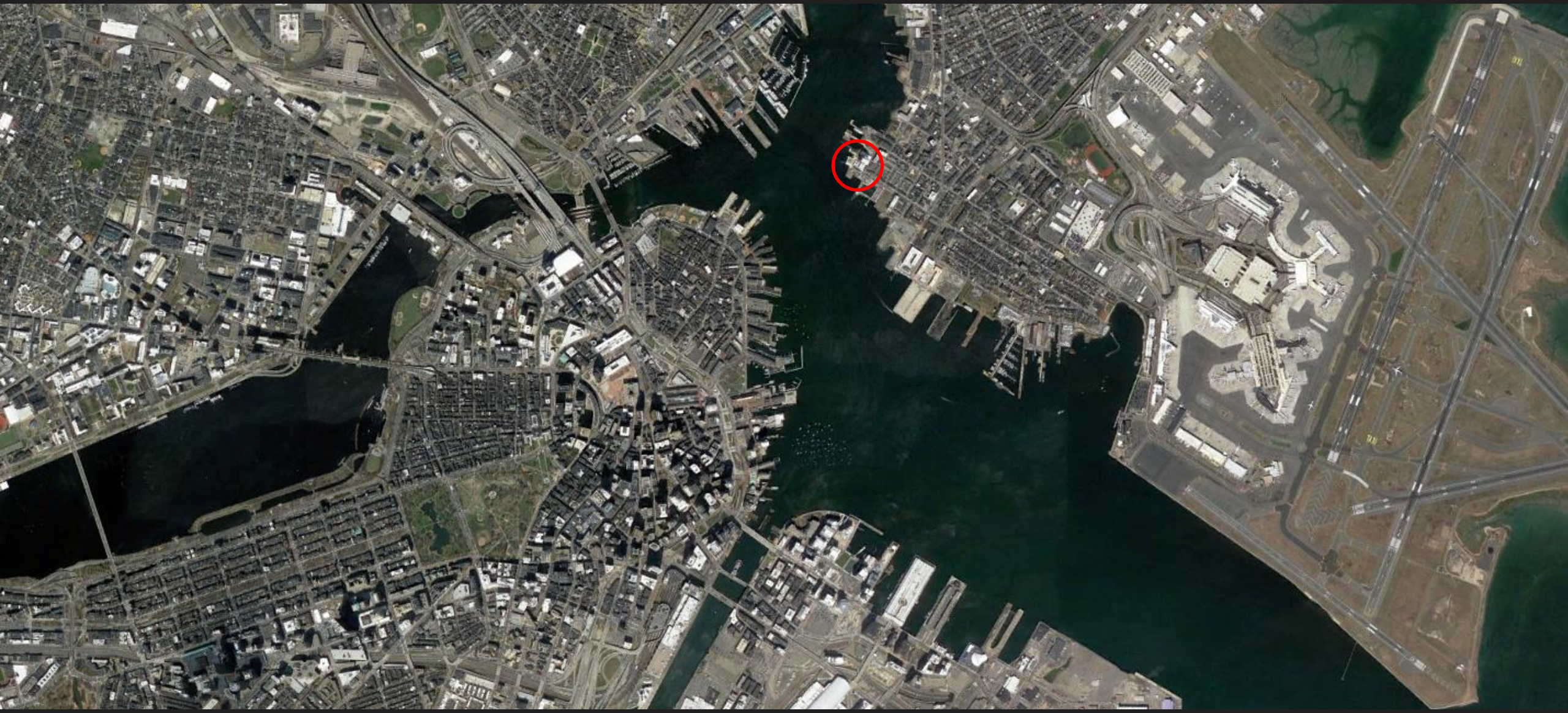
100-year Storm?

Macro Context

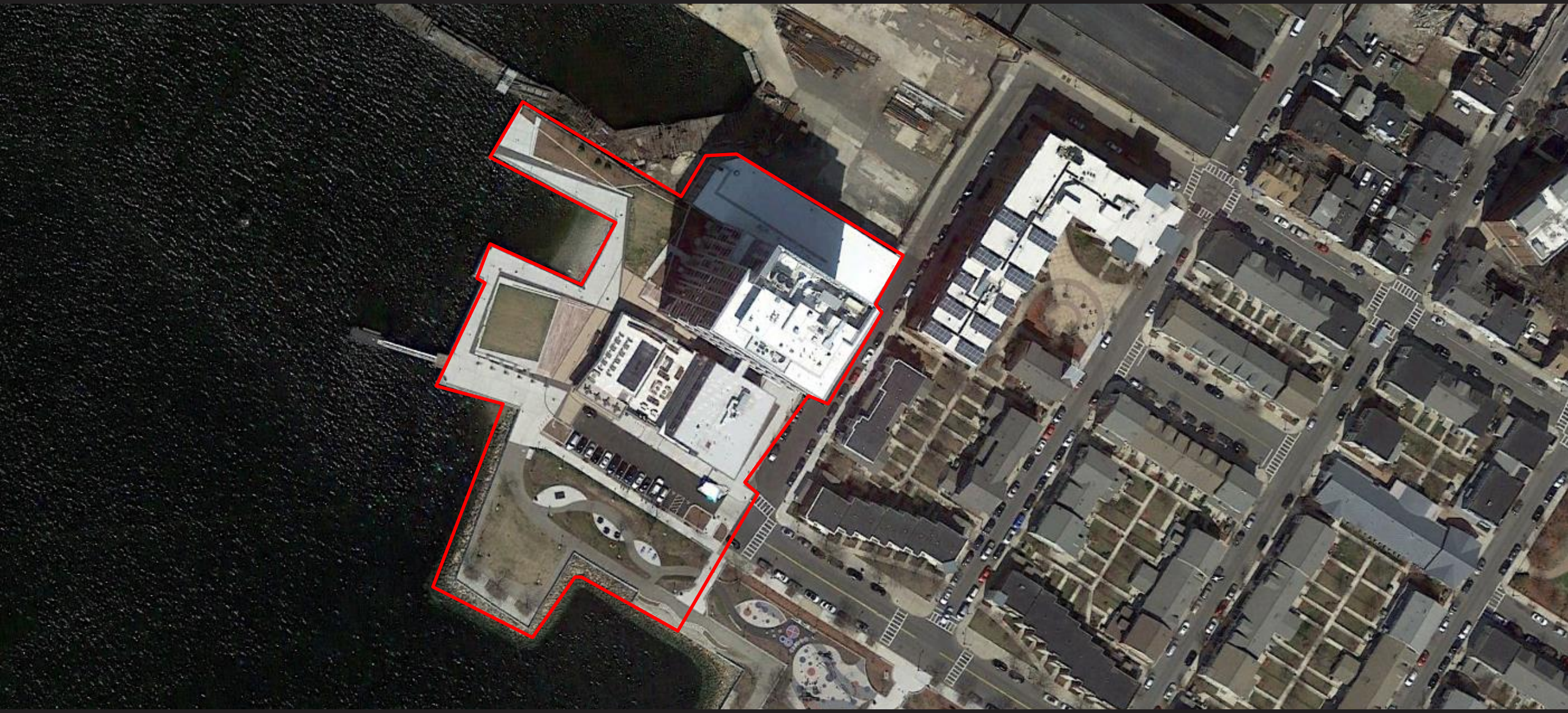


Urban Context



Neighborhood Context

Micro Context



Existing Condition

“Bottleneck”

3 Big Risks

FUTURE IMPACTS

THE MORE GREENHOUSE GASES IN THE ATMOSPHERE:

MORE HOT DAYS

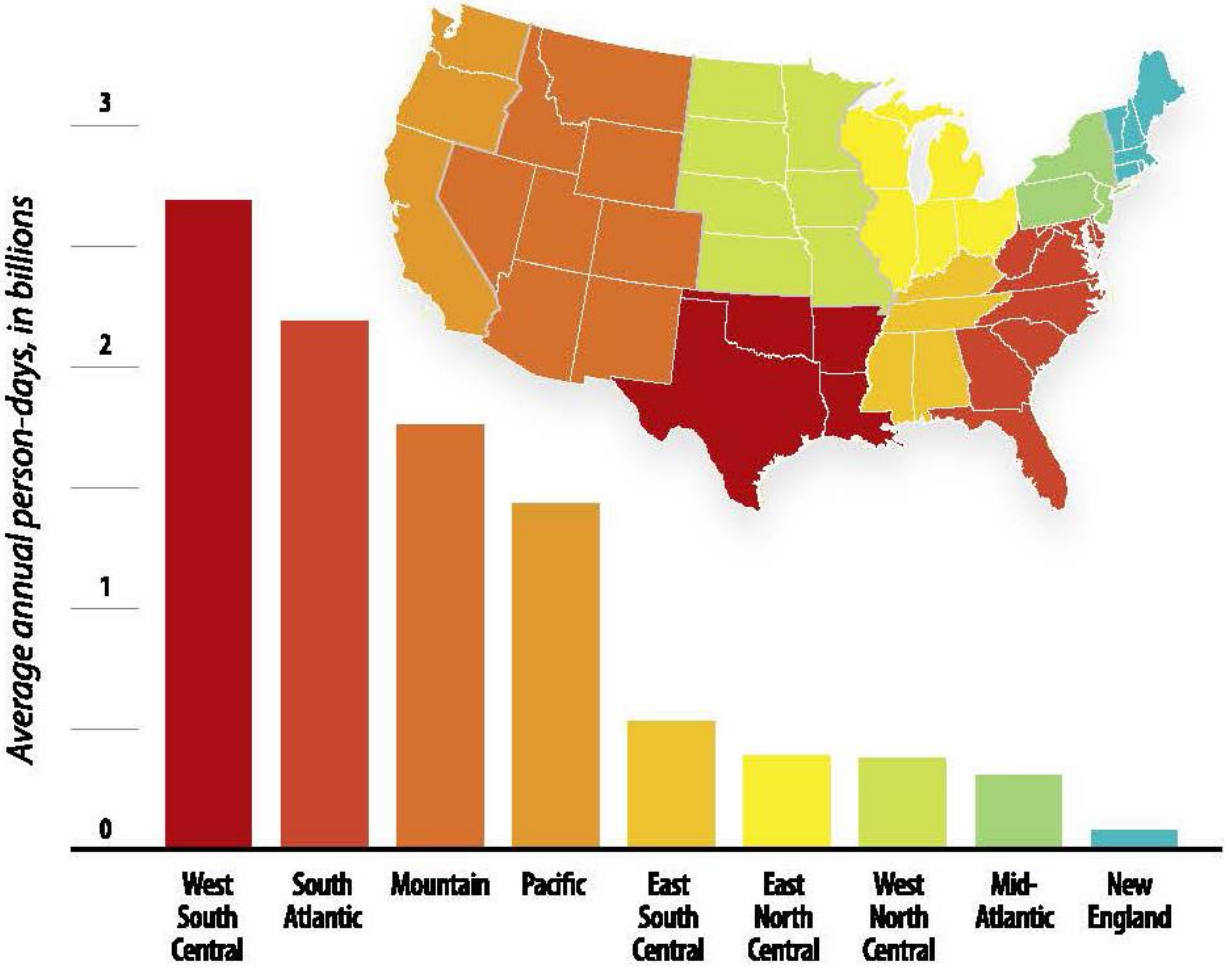
INCREASED EXTREME PRECIPITATION

GREATER AMOUNTS OF SEA LEVEL RISE

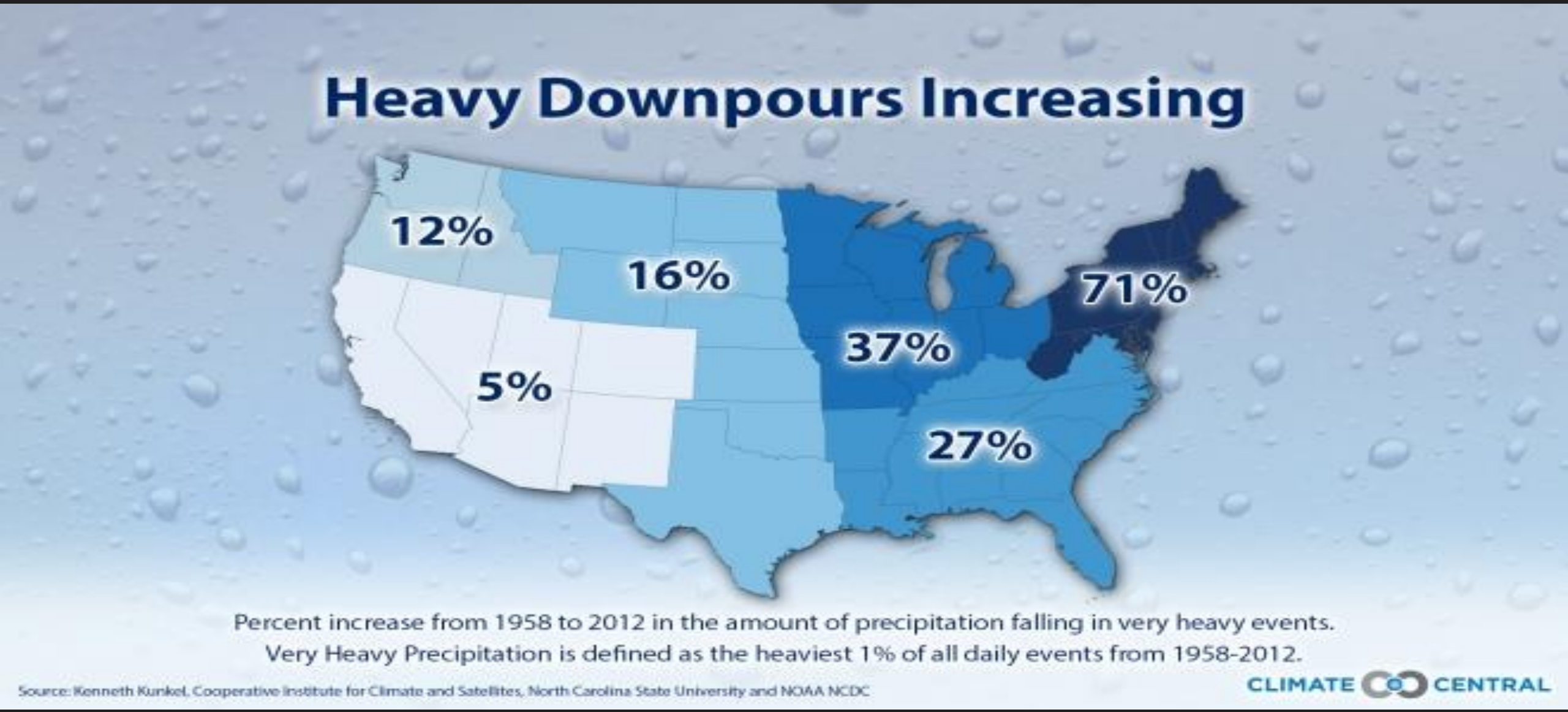
3 Big Risks

Exposure to Extreme Heat on the Rise

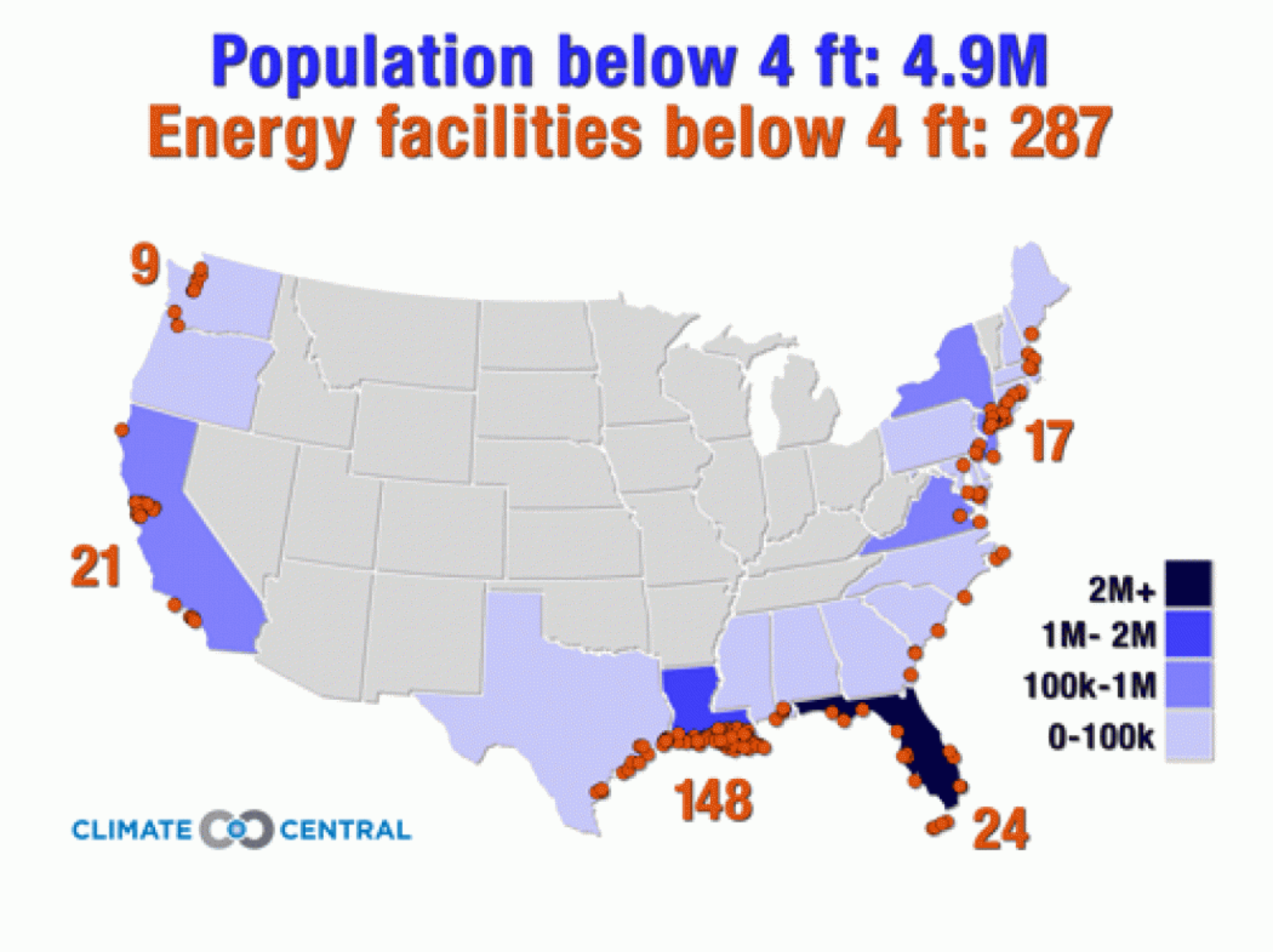
1971–2000 vs. 2041–2070



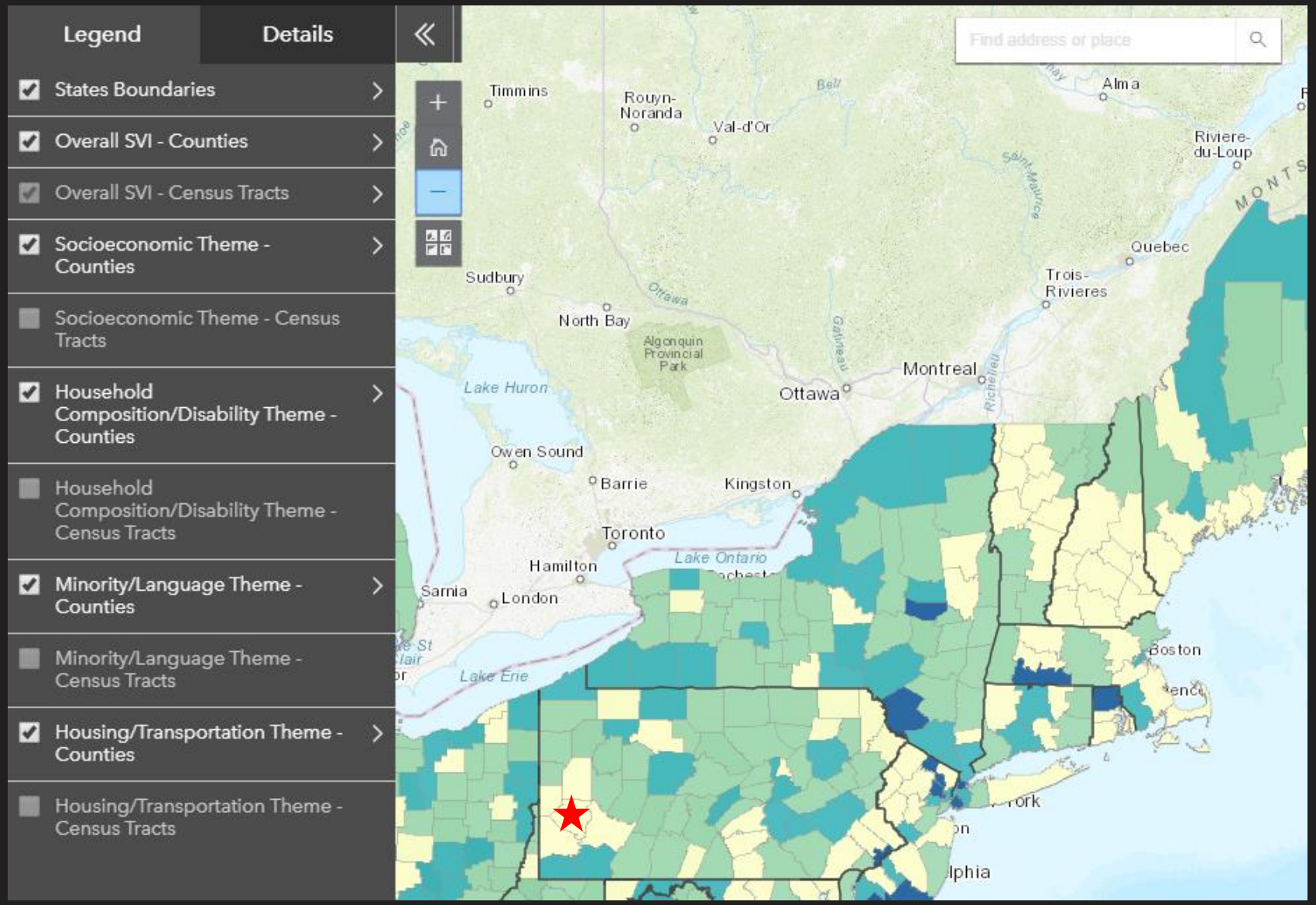
3 Big Risks


Heavy Downpours Increasing
12%
16%
5%
37%
27%
71%
Percent increase from 1958 to 2012 in the amount of precipitation falling in very heavy events.
Very Heavy Precipitation is defined as the heaviest 1% of all daily events from 1958-2012.
Source: Kenneth Kunkel, Cooperative Institute for Climate and Satellites, North Carolina State University and NOAA NCDC
CLIMATE CENTRAL

3 Big Risks


Population below 4 ft: 4.9M
Energy facilities below 4 ft: 287
9
21
17
148
24
2M+
1M- 2M
100k-1M
0-100k
CLIMATE CENTRAL

CDC Social Vulnerabilities Map



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Living With Water Competition – 2015

Imagine Boston 2030 - Greenovate

- 1st Masterplan in 50 Years
  - Economic Growth
  - Housing Affordability
  - Population Growth
  - Climate Change
  - Social Equity
  - Technological Integration

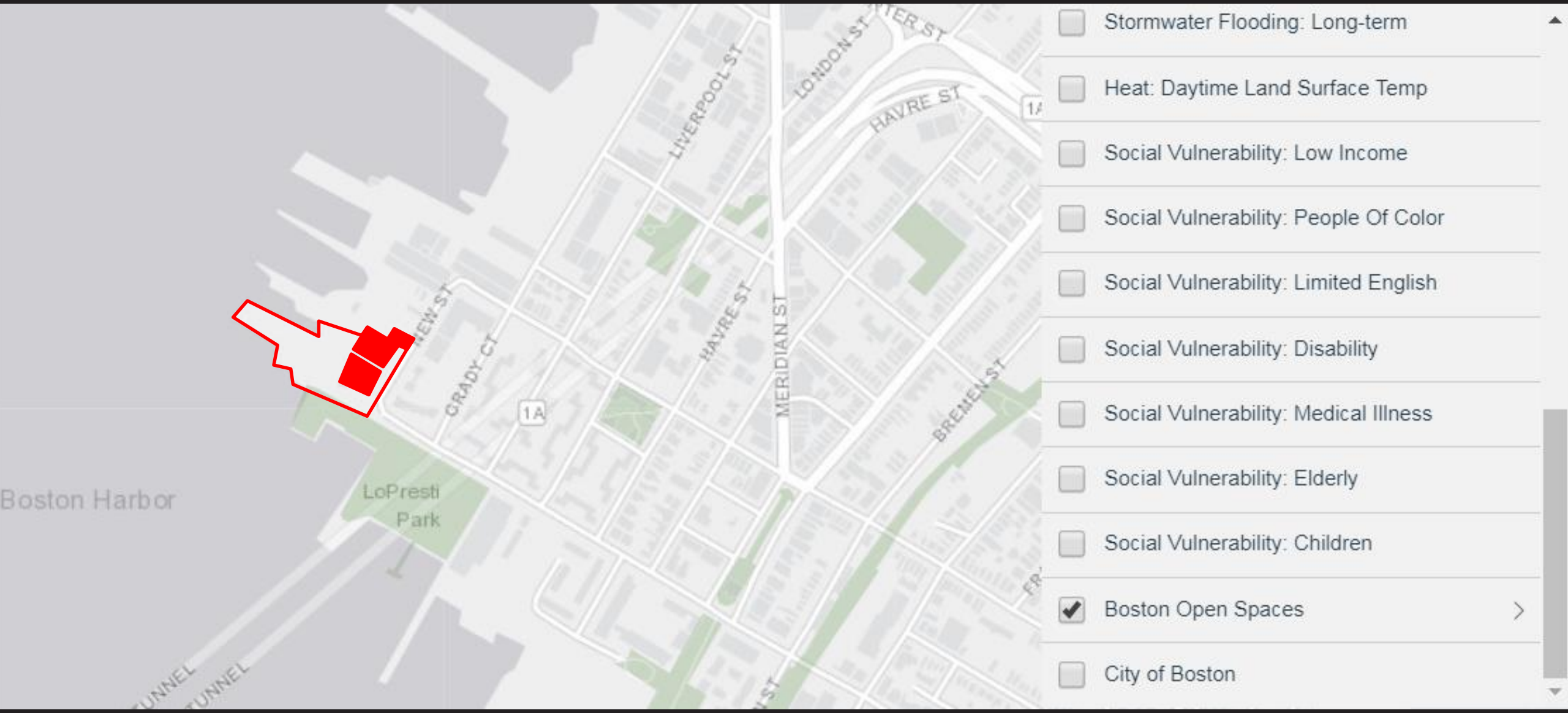
  - New Neighborhoods
  - Waterfront Engagement
  - Transportation
  - Land Use Planning
  - Arts & Culture

Risks: 36” Sea Level Rise (2070+)

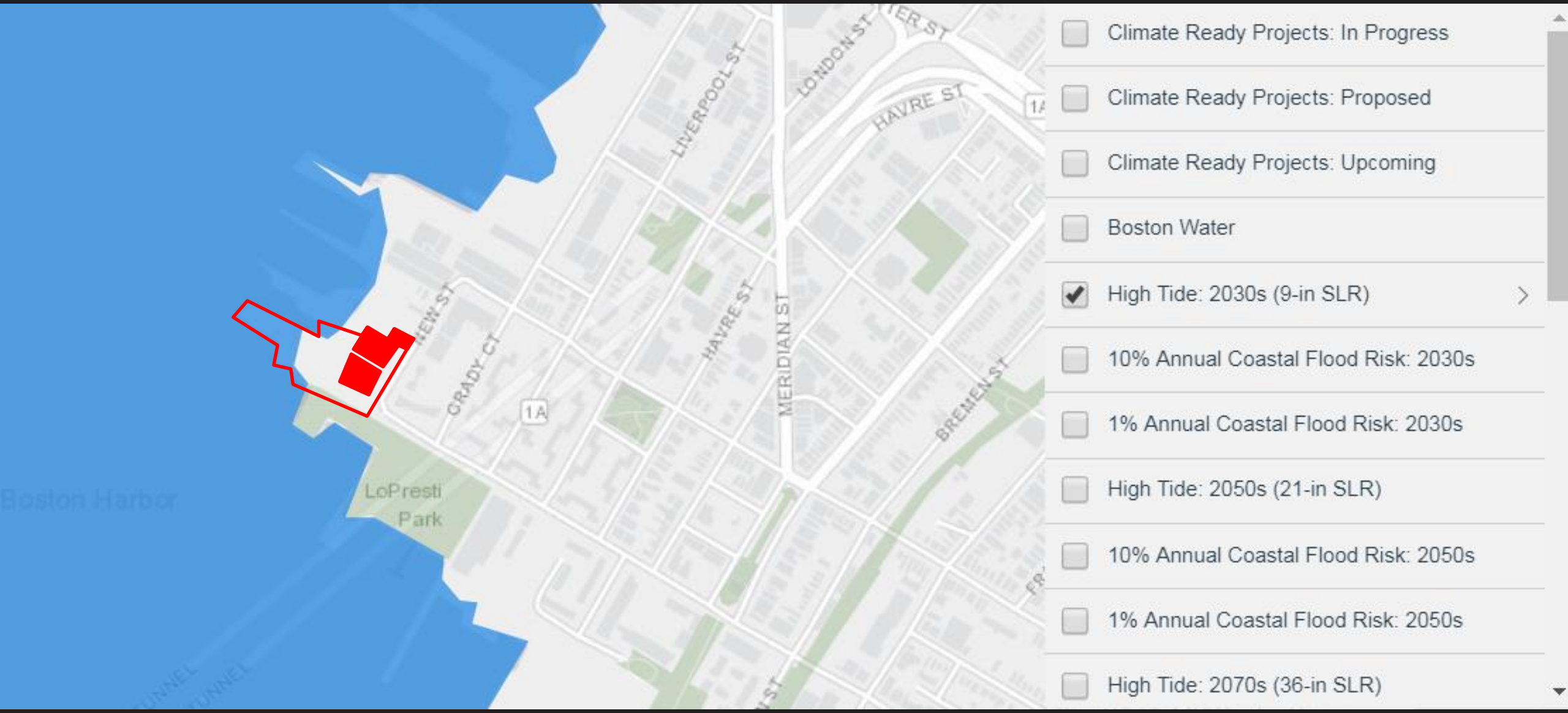
Another name for the "1 percent annual chance flood" is the "100-year flood." Experts prefer not to use the "100-year" term, since it gives the impression that a certain level of flooding will only occur once every 100 years. In fact, it has a 1 percent chance of occurring in any given year, and can even occur two years in a row. Over a 30-year period, there is almost a 1 in 3 chance that a 1 percent annual chance flood will occur at least once. The average monthly high tide is the area expected to be flooded about once a month even without a storm.

- Average Monthly High Tide
- Land that has a 10% annual chance of flooding
- Land that has a 1% annual chance of flooding

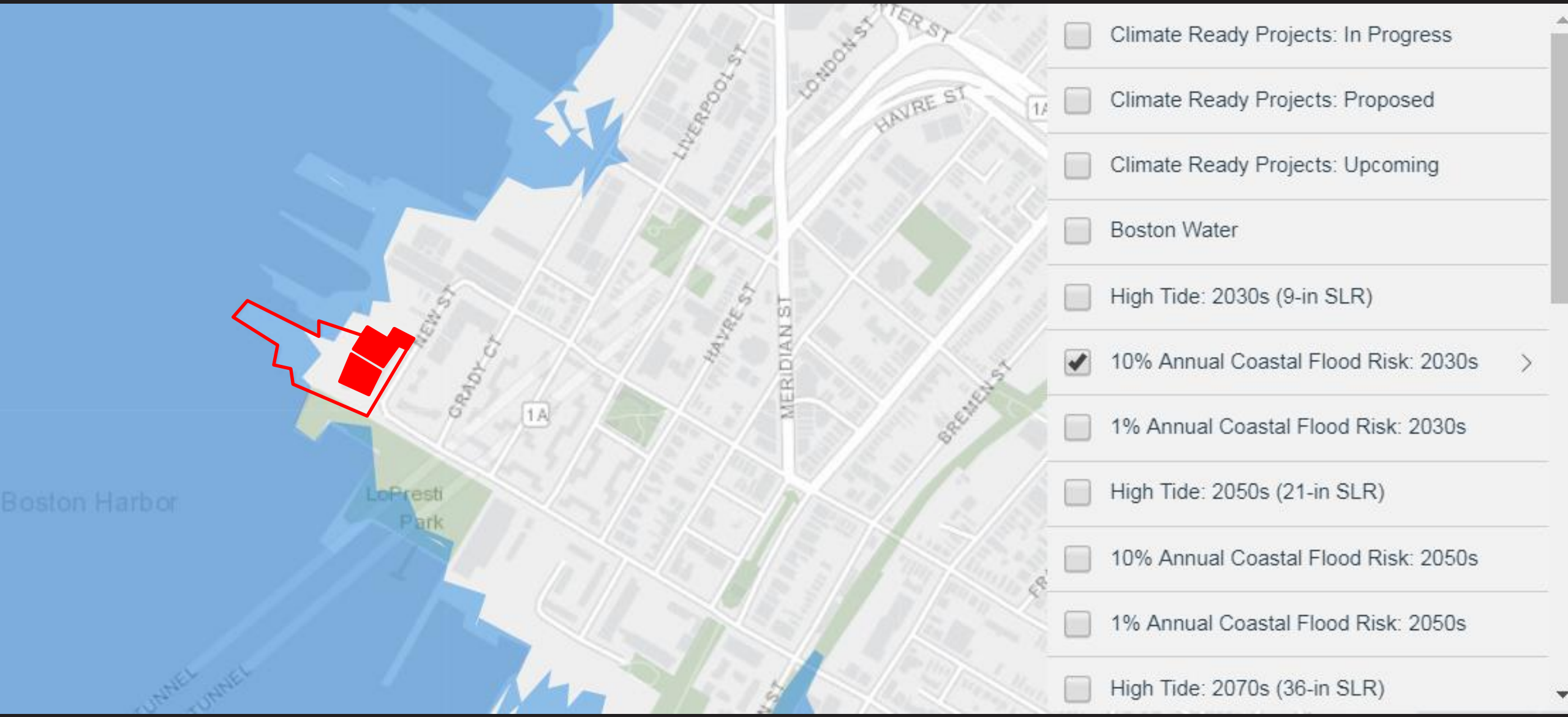
Site/Neighborhood



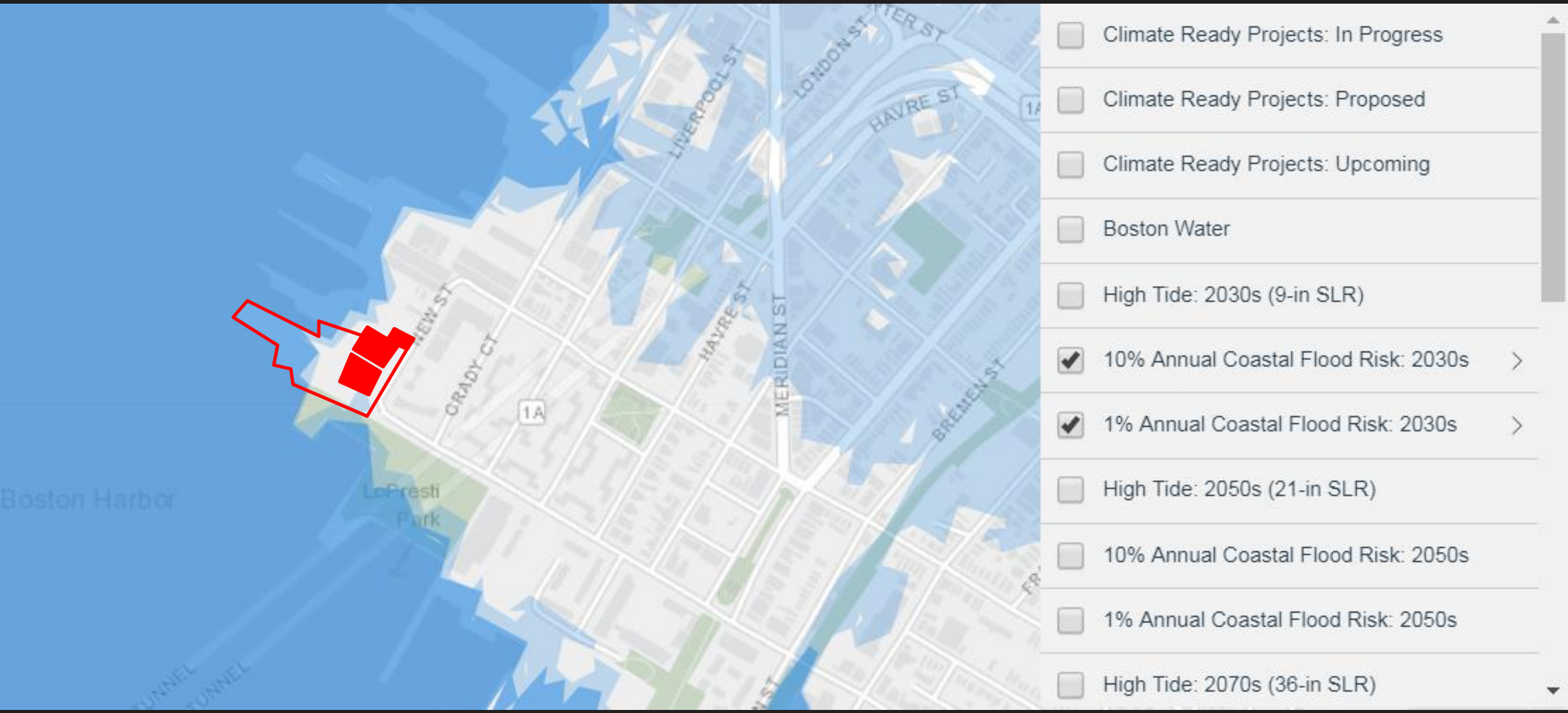
2030 High Tide (9” Sea Level Rise)



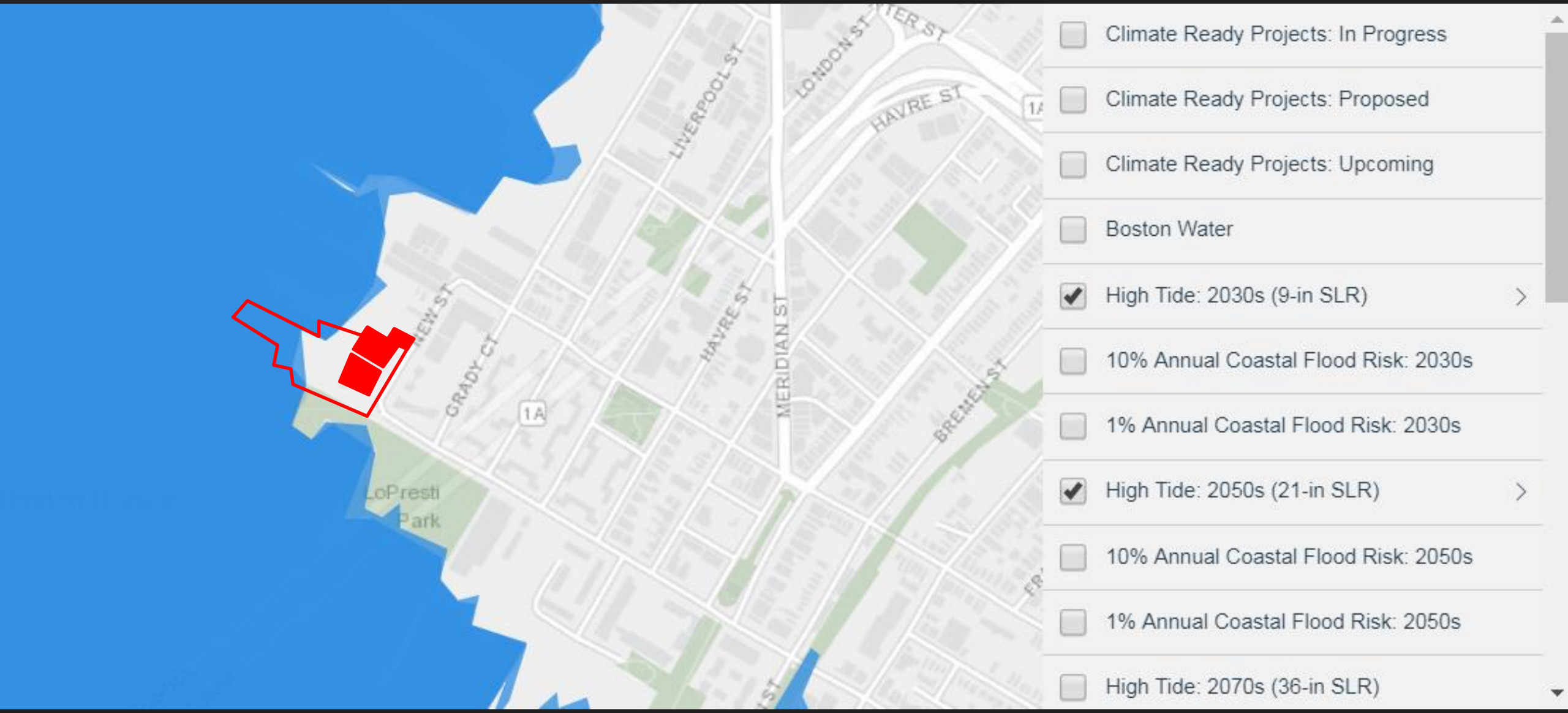
2030 10% Annual Coastal Flood



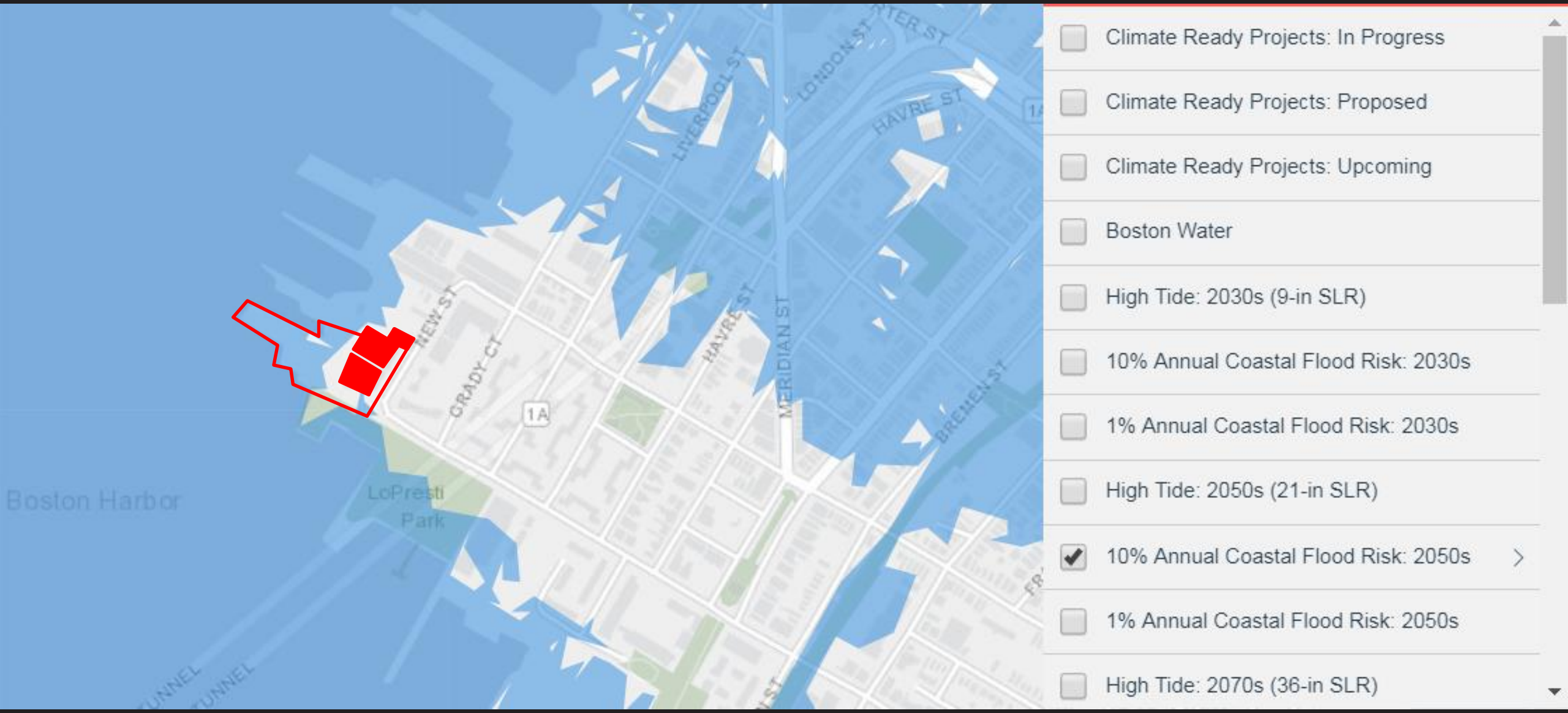
2030 1% Annual Coastal Flood



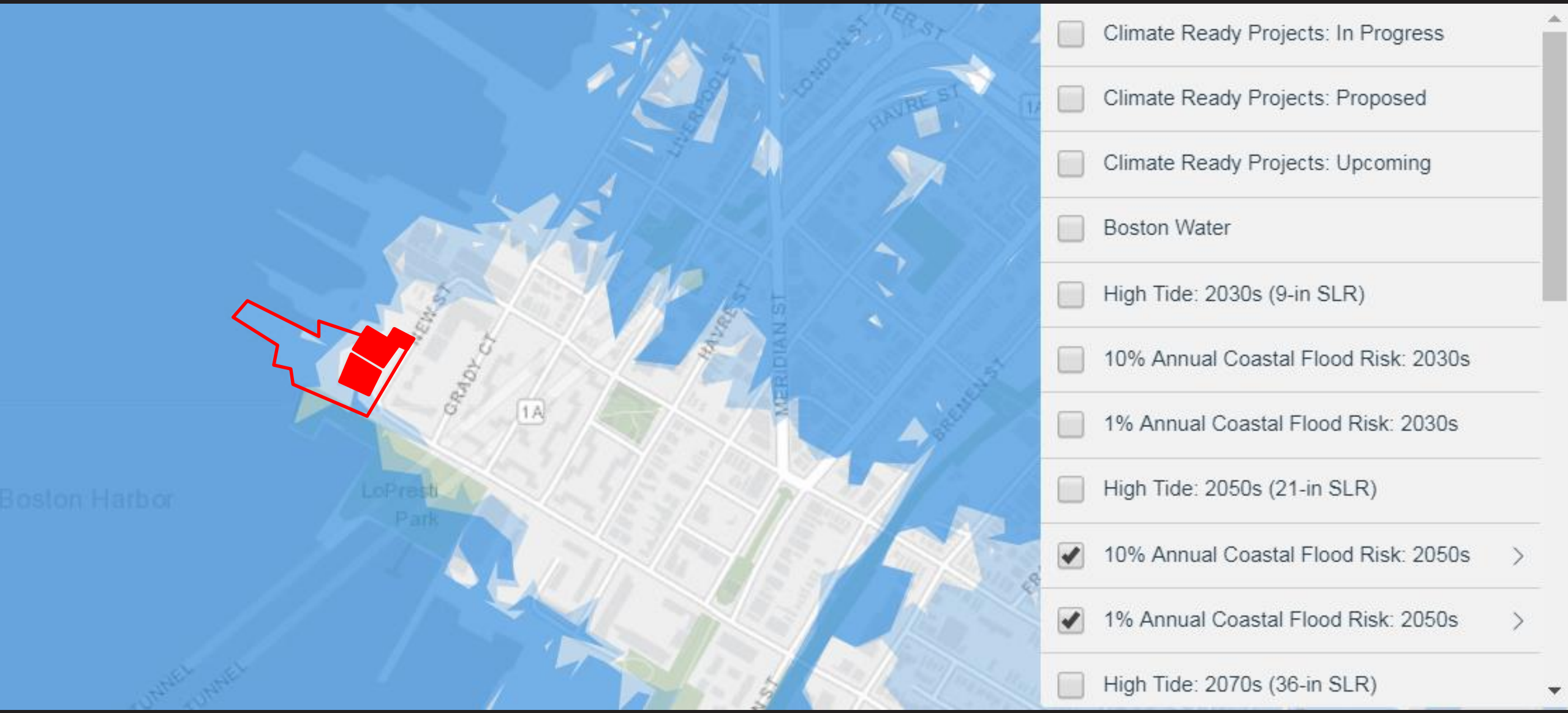
2050 High Tide (21" Sea Level Rise)



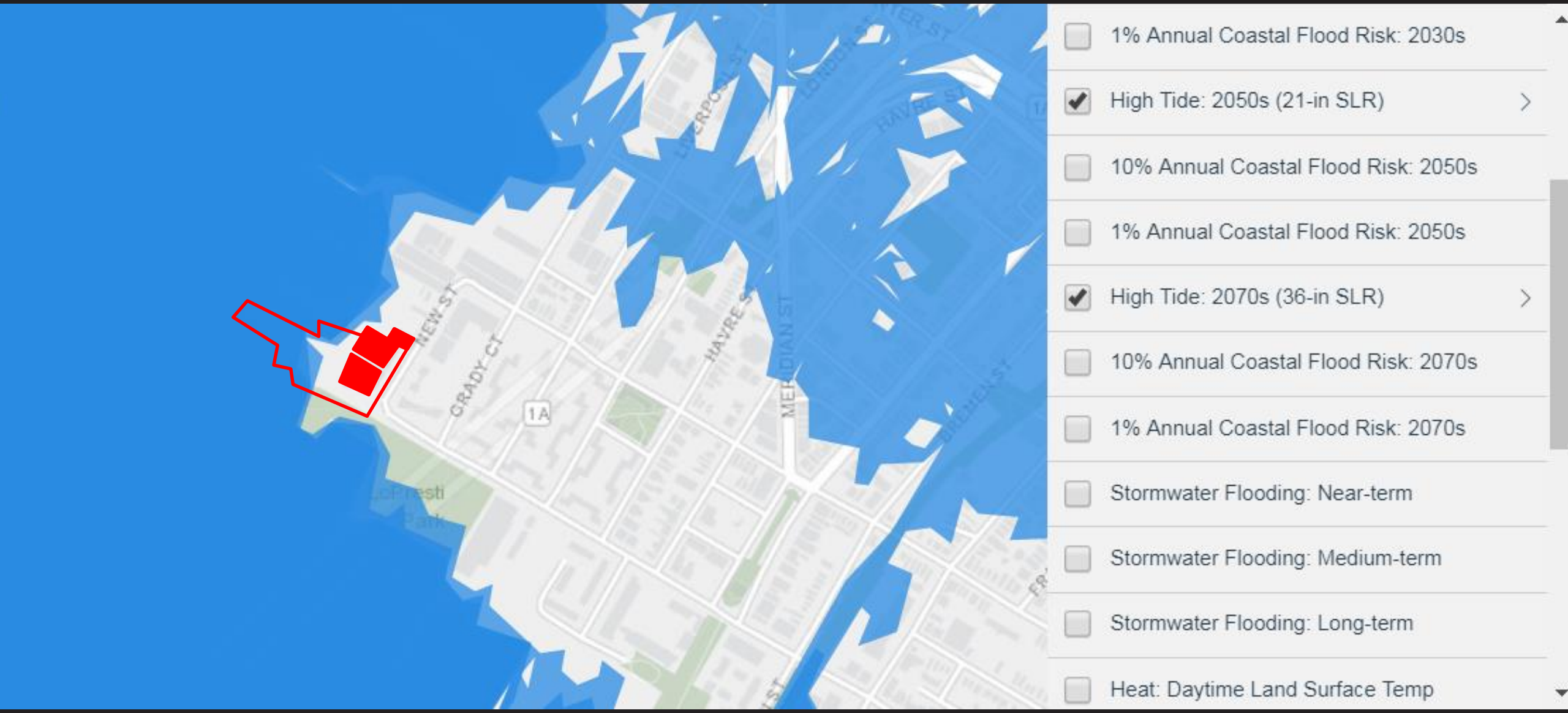
2050 10% Annual Coastal Flooding



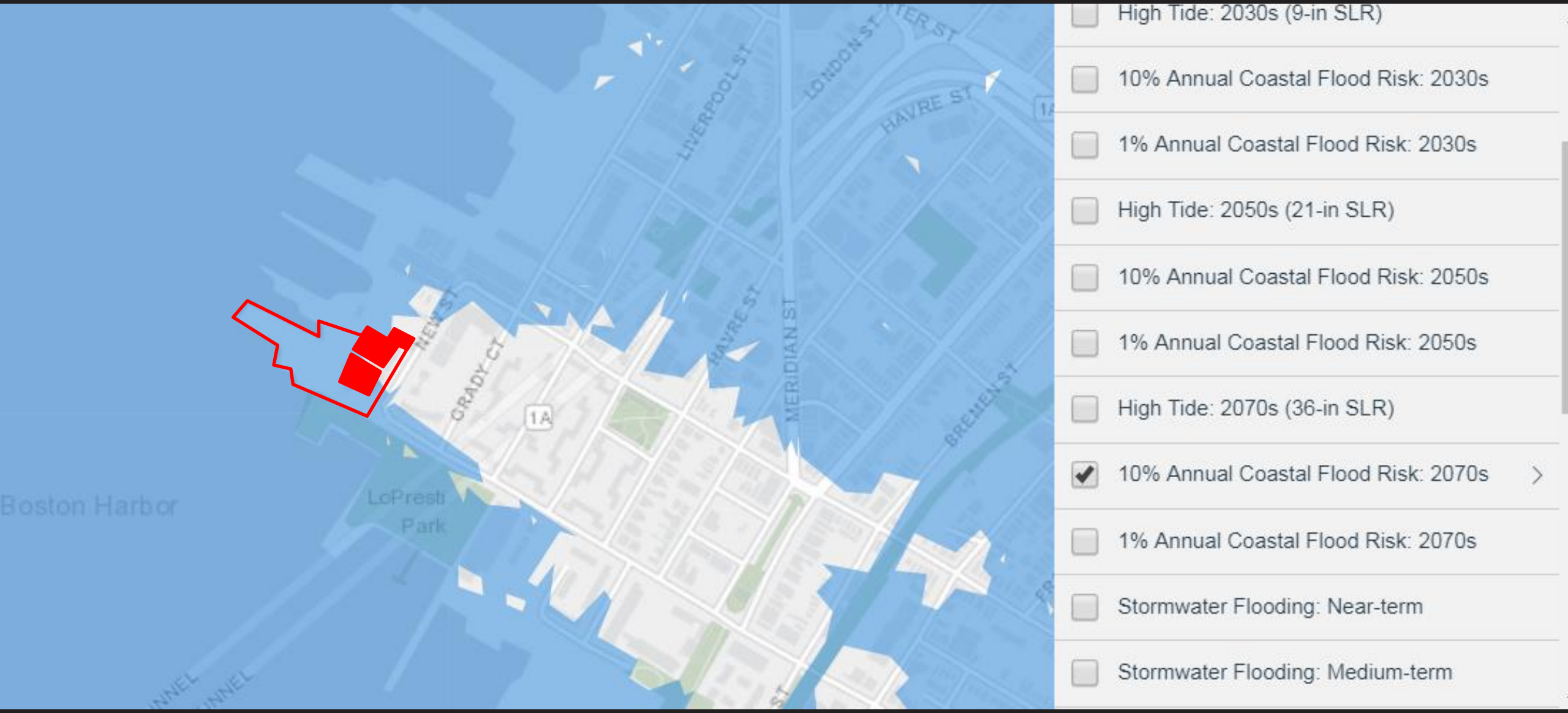
2050 1% Annual Coastal Flooding



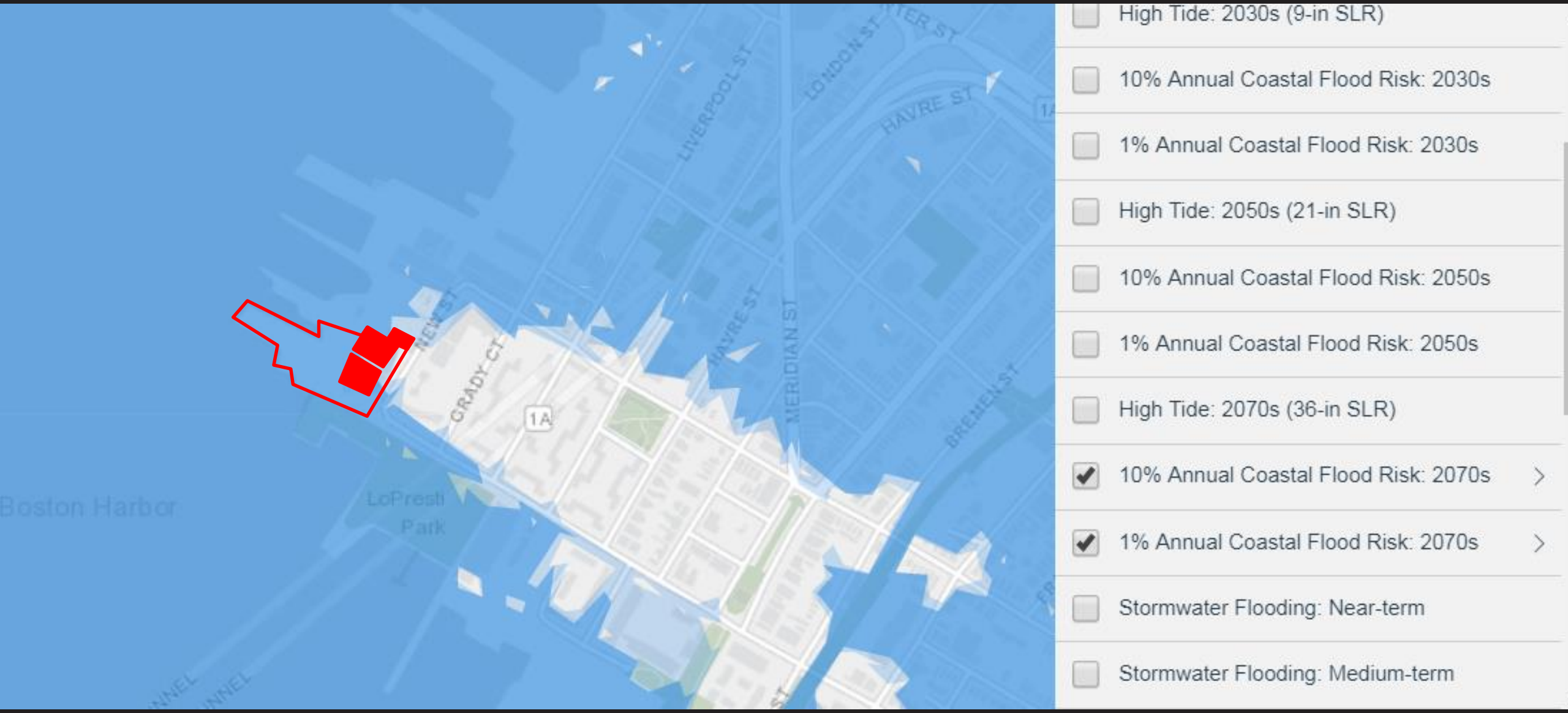
2070 High Tide (36" Sea Level Rise)



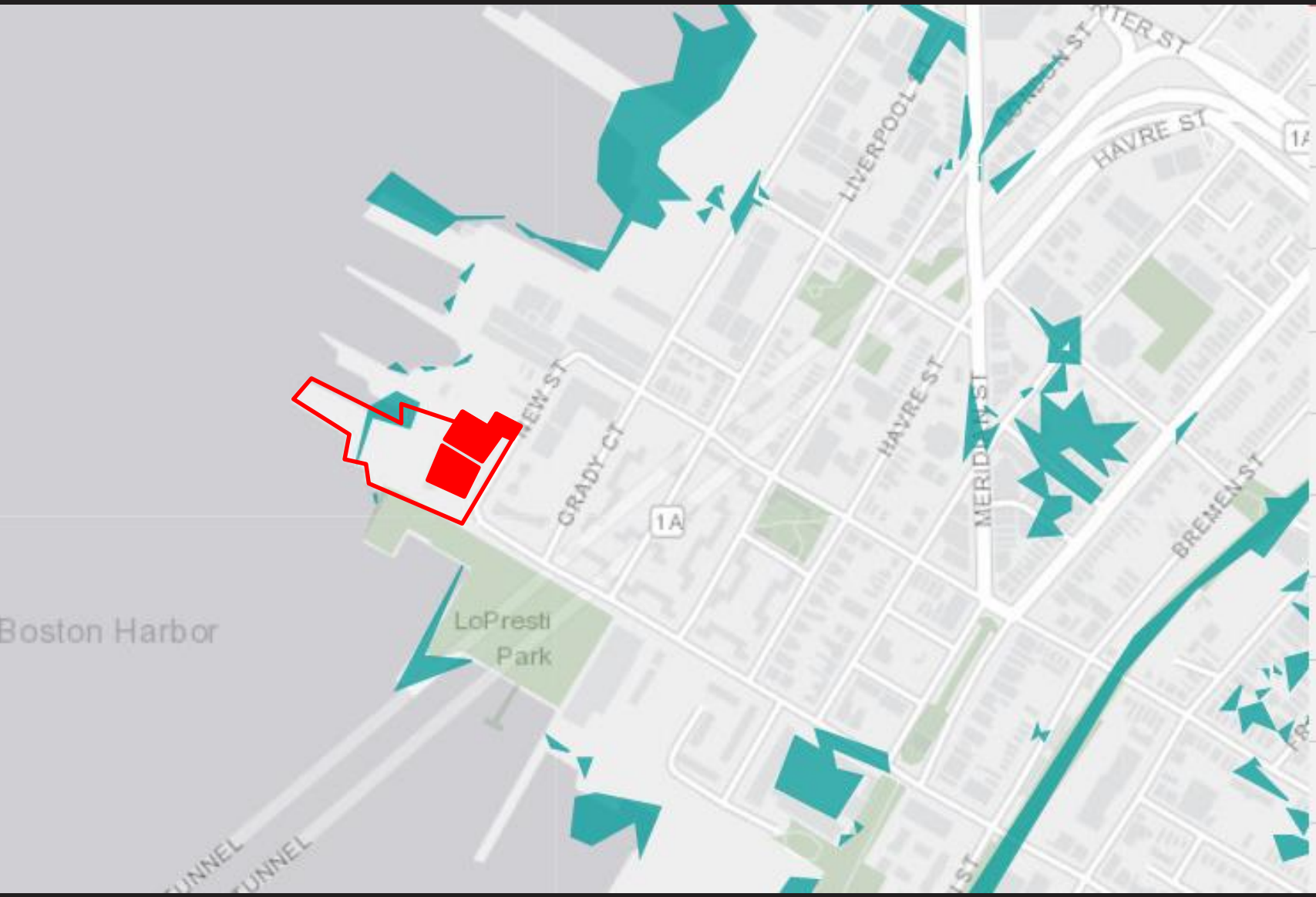
2070 10% Annual Costal Flooding



2070 1% Annual Costal Flooding

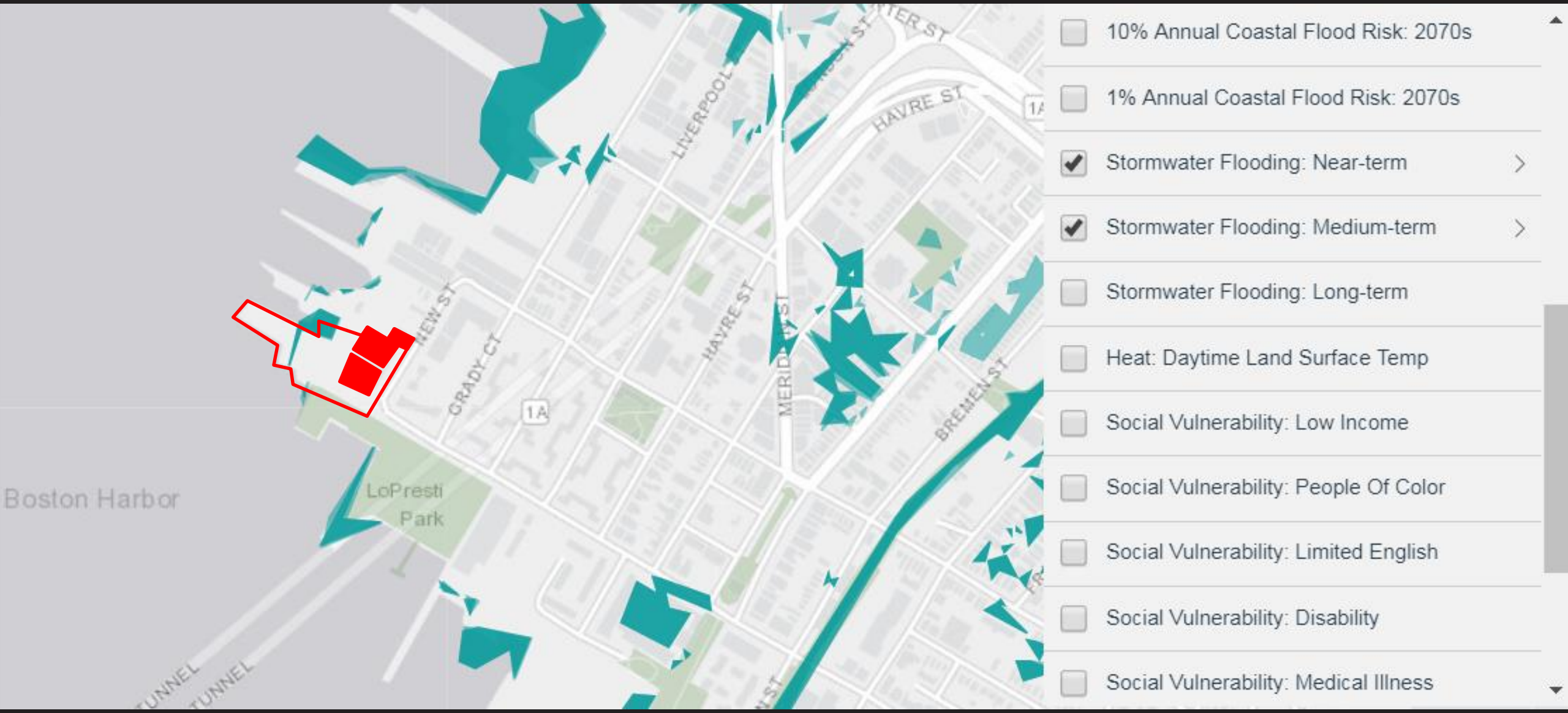


Near-term Stormwater Flooding

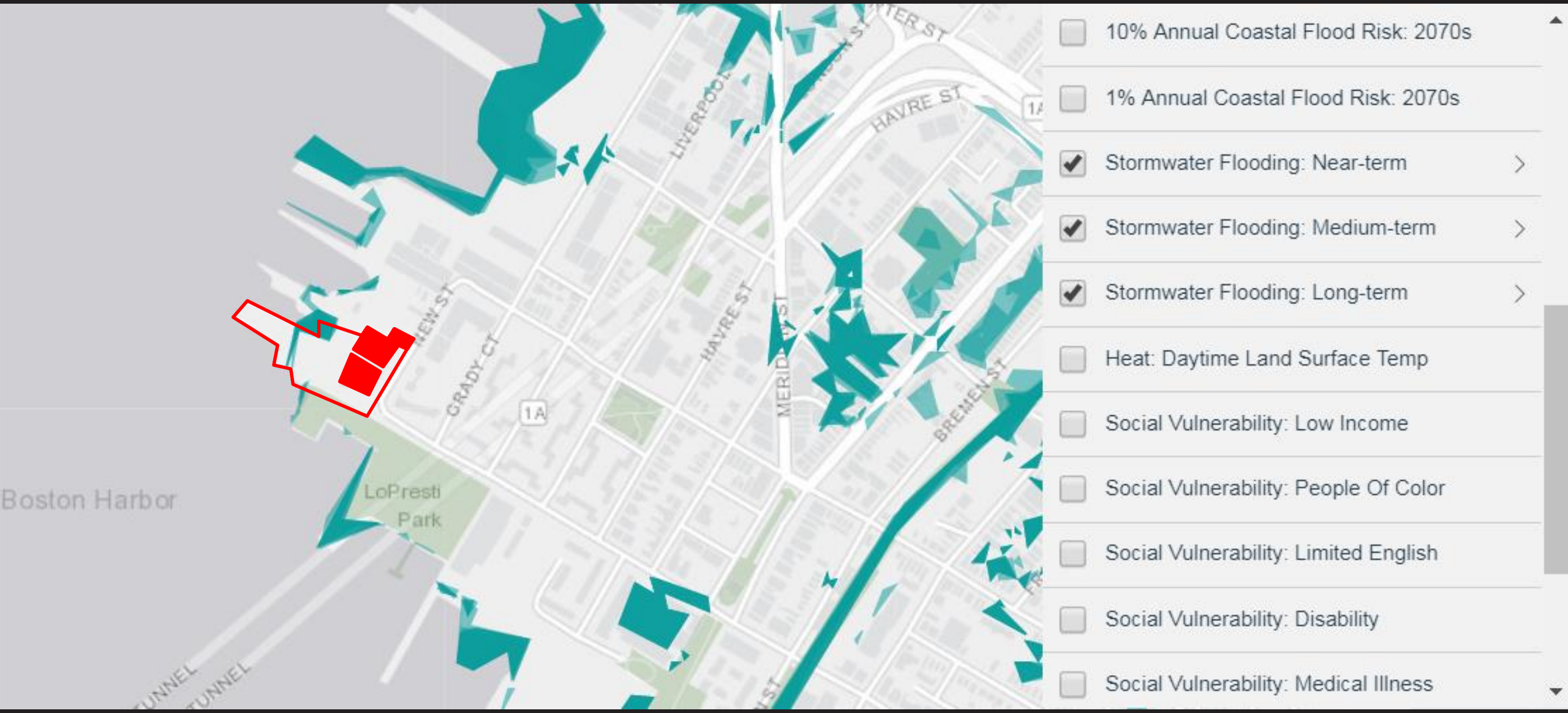


- [ ] 10% Annual Coastal Flood Risk: 2070s
- [ ] 1% Annual Coastal Flood Risk: 2070s
- [x] Stormwater Flooding: Near-term
- [ ] Stormwater Flooding: Medium-term
- [ ] Stormwater Flooding: Long-term
- [ ] Heat: Daytime Land Surface Temp
- [ ] Social Vulnerability: Low Income
- [ ] Social Vulnerability: People Of Color
- [ ] Social Vulnerability: Limited English
- [ ] Social Vulnerability: Disability
- [ ] Social Vulnerability: Medical Illness

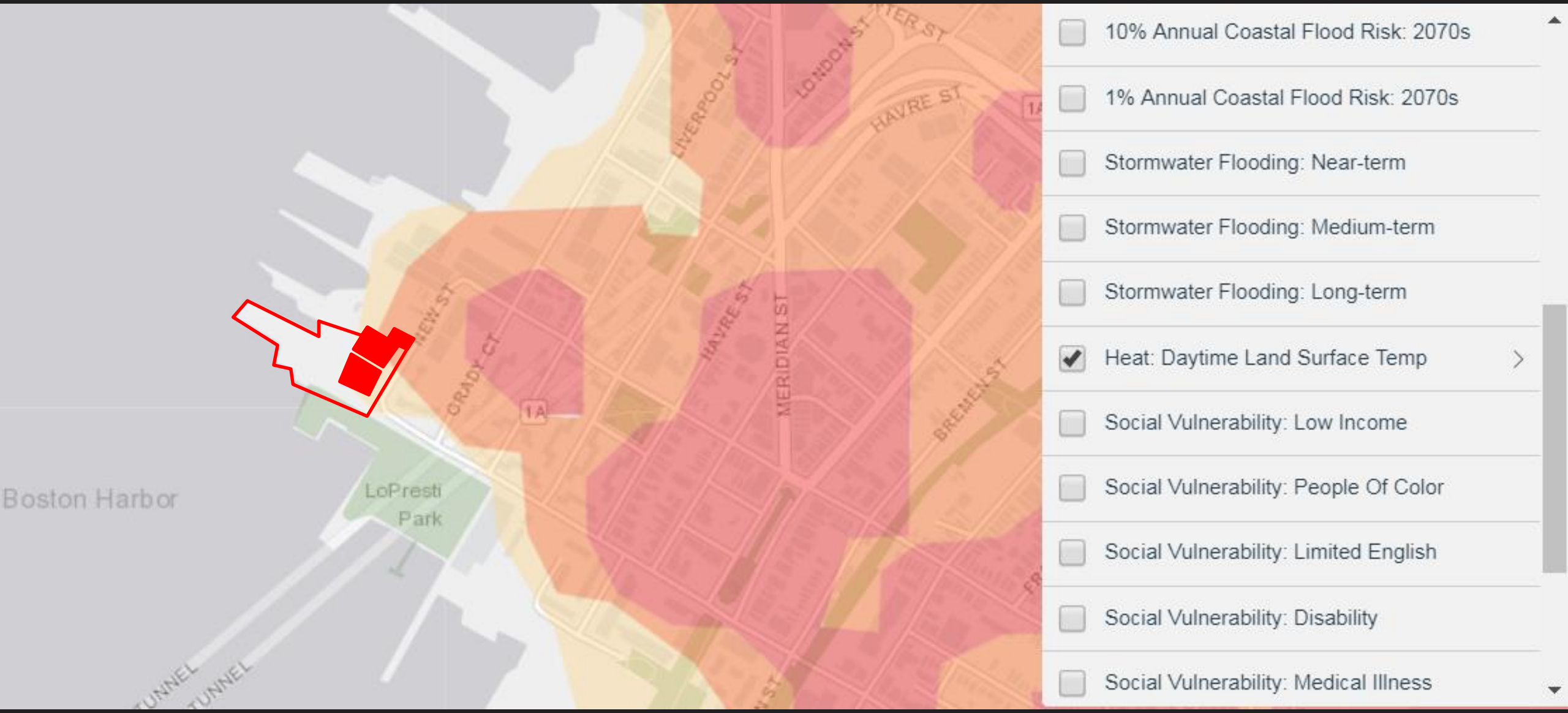
Medium-term Stormwater Flooding



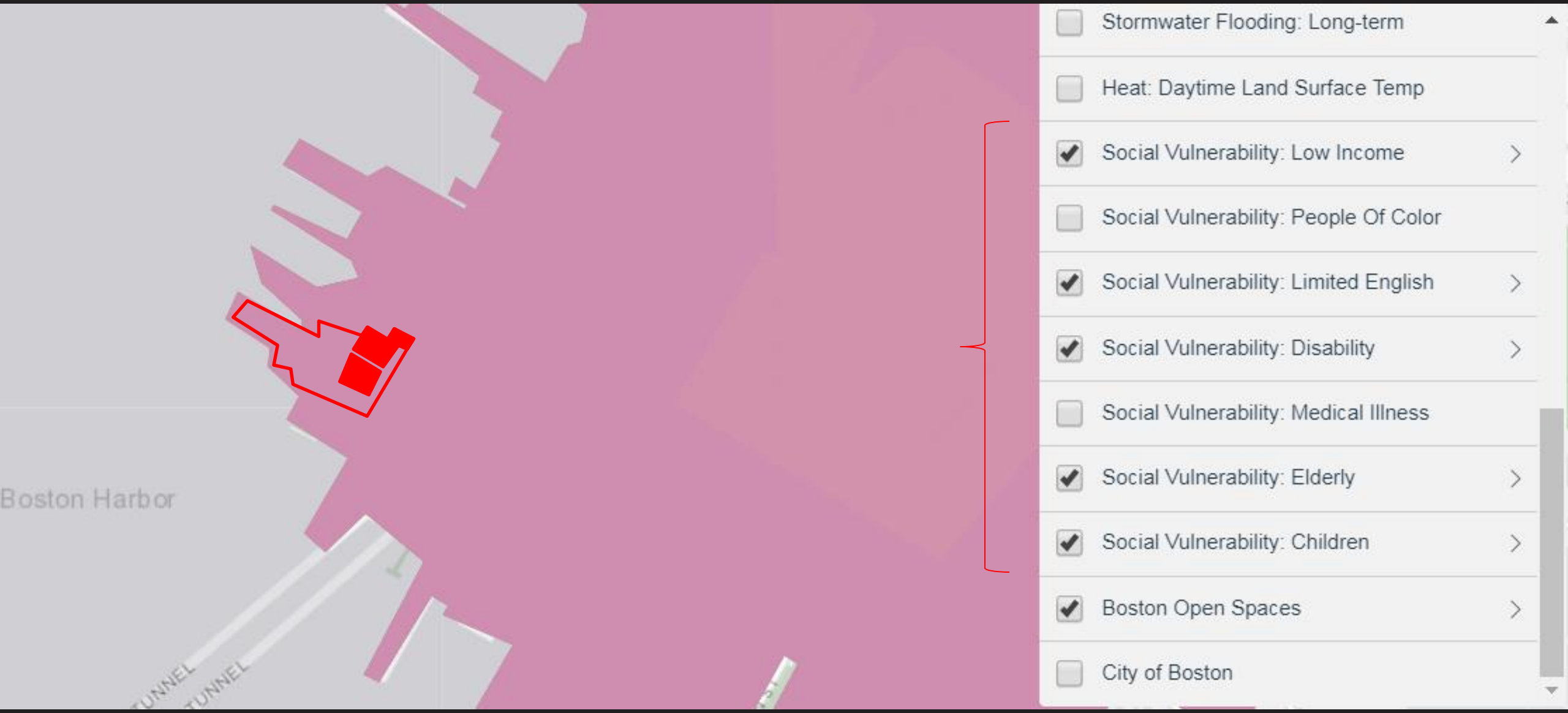
Long-term Stormwater Flooding



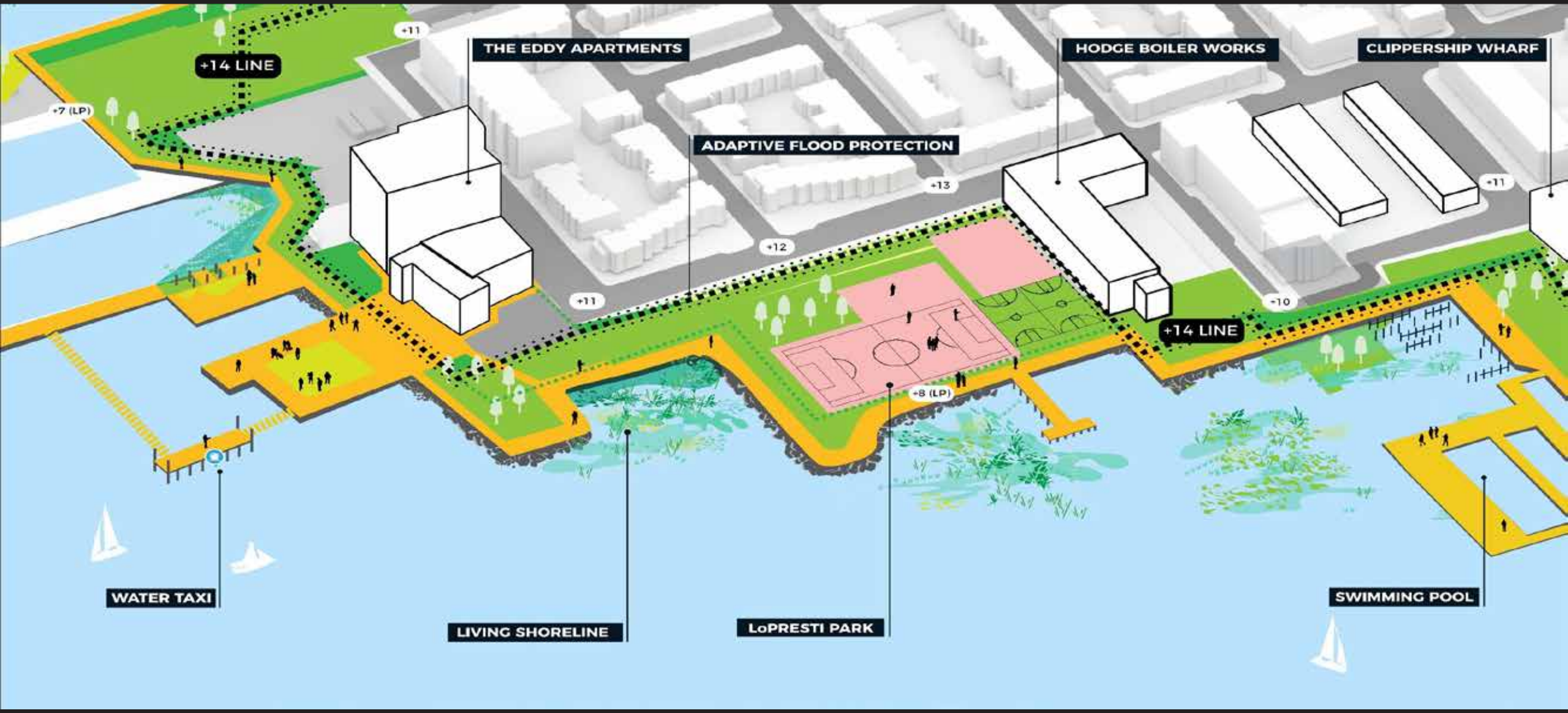
Urban Heat Island



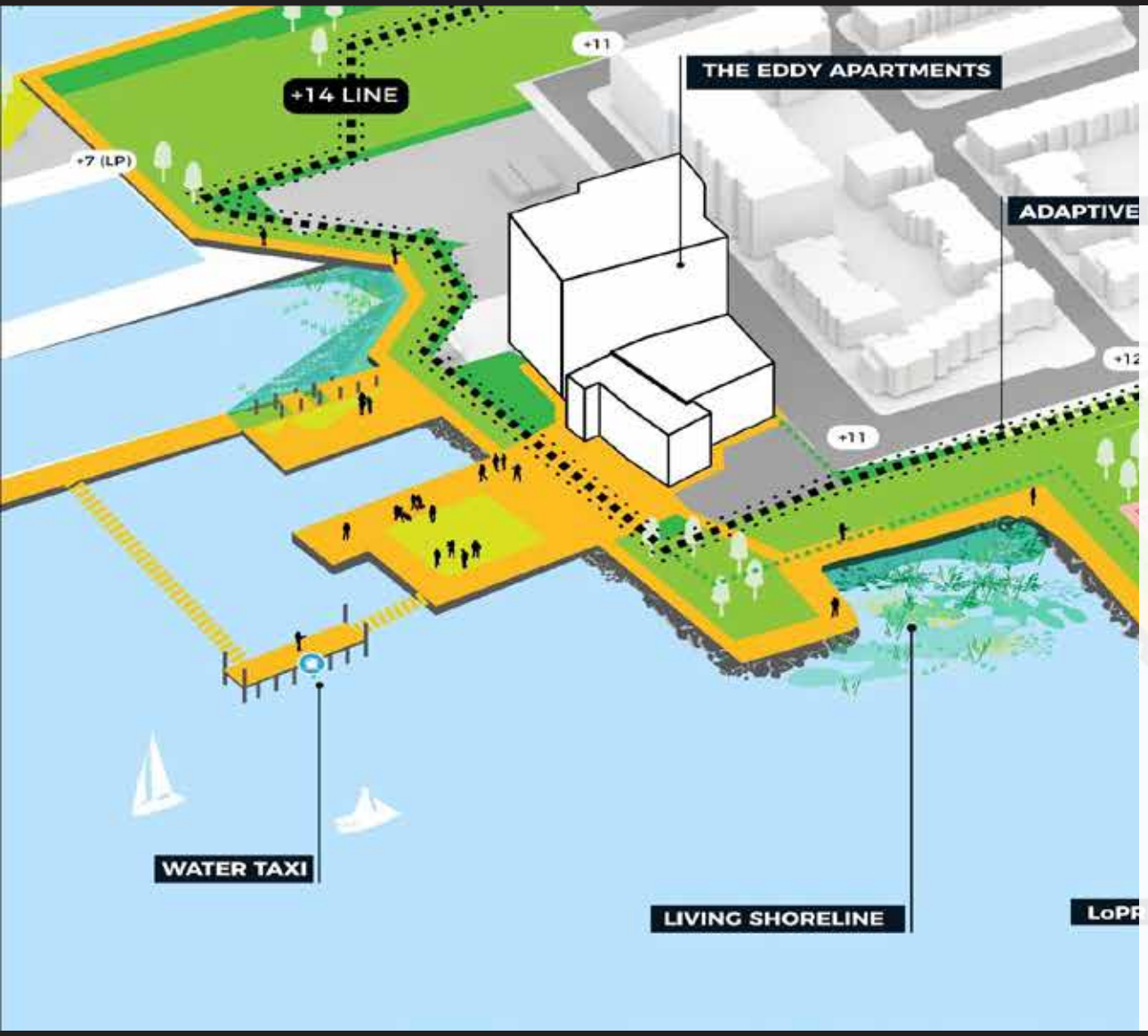
Social Vulnerabilities



Climate Ready East Boston

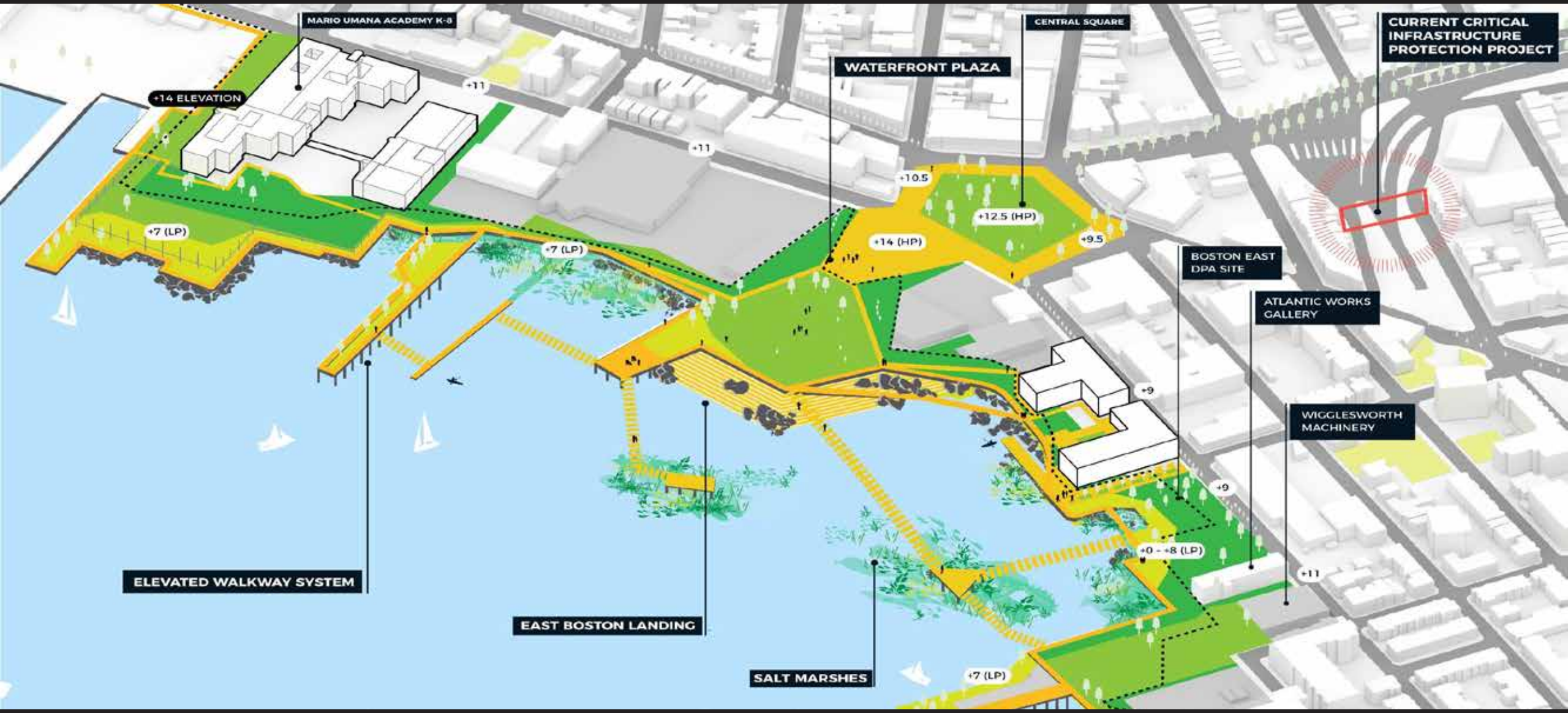


Climate Ready East Boston



- Elevated Harborwalk ($500,000-$900,000)
- Cross-street Deployable Flood Wall ($150,000)
- Protects Residences & MBTA Station
- Site Elevations by NAVD88

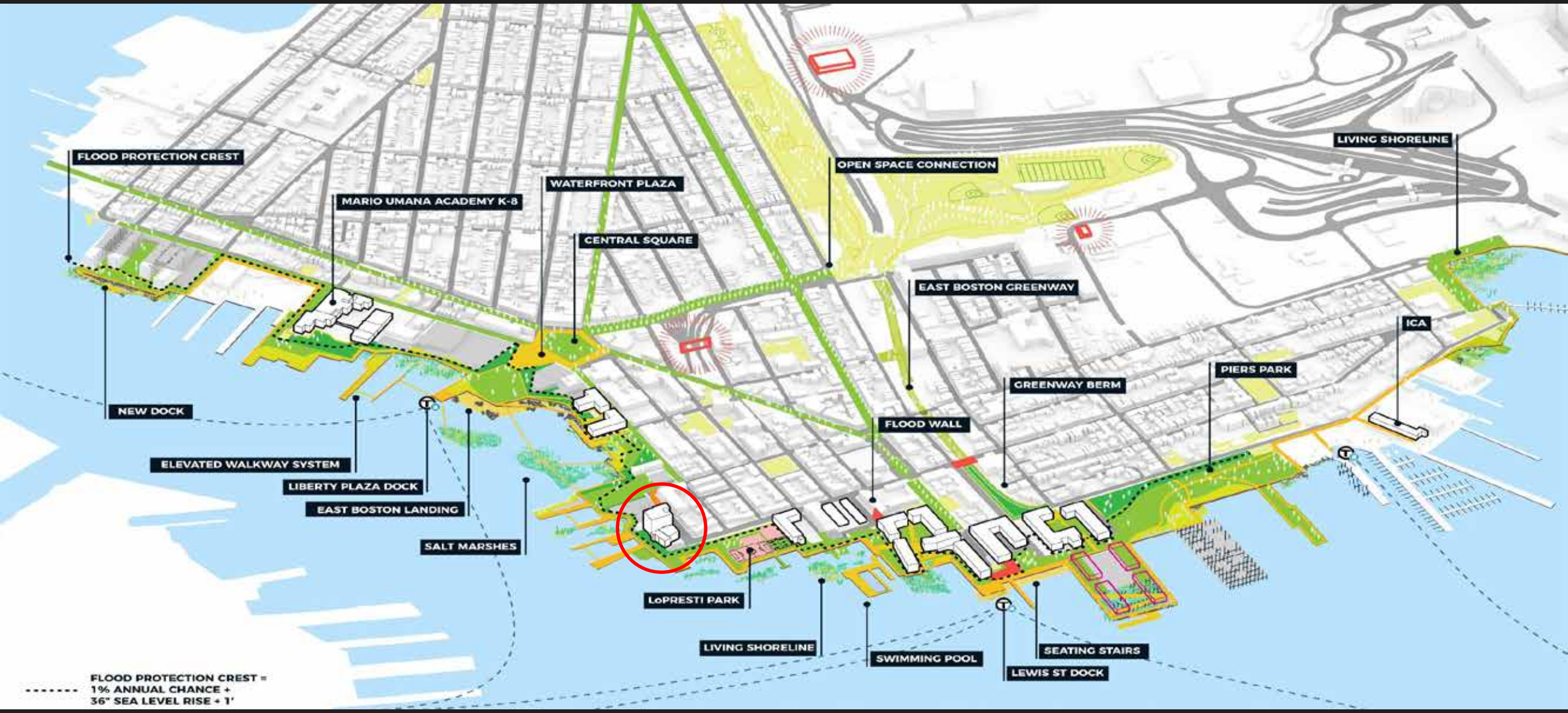
Climate Ready East Boston



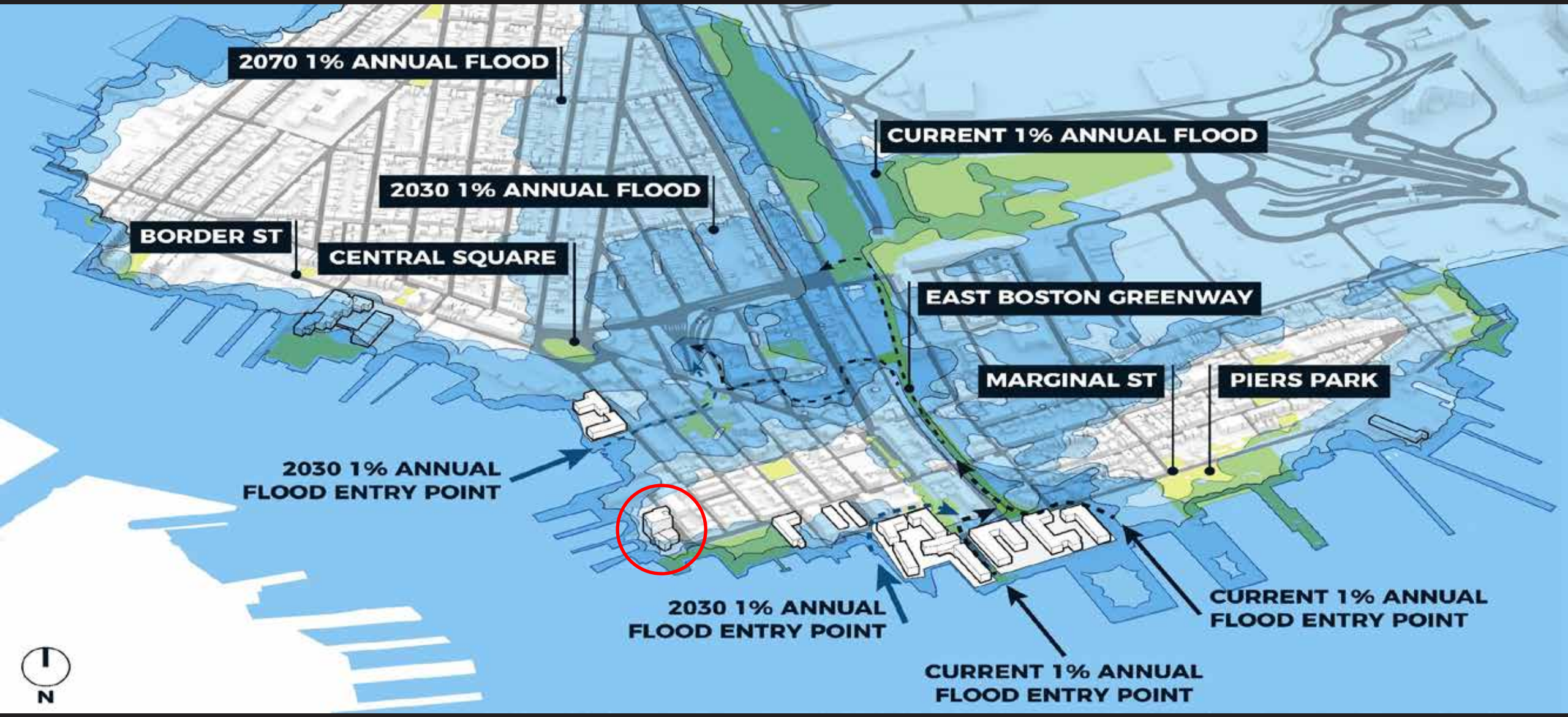
Climate Ready East Boston

- 9” estimated sea level rise (2030)
- Unified Coastal Solution
- Changes to Zoning & Designated Port Areas
- New Network of Open Spaces (Expandable Over Time)
- Site Elevations by NAVD88

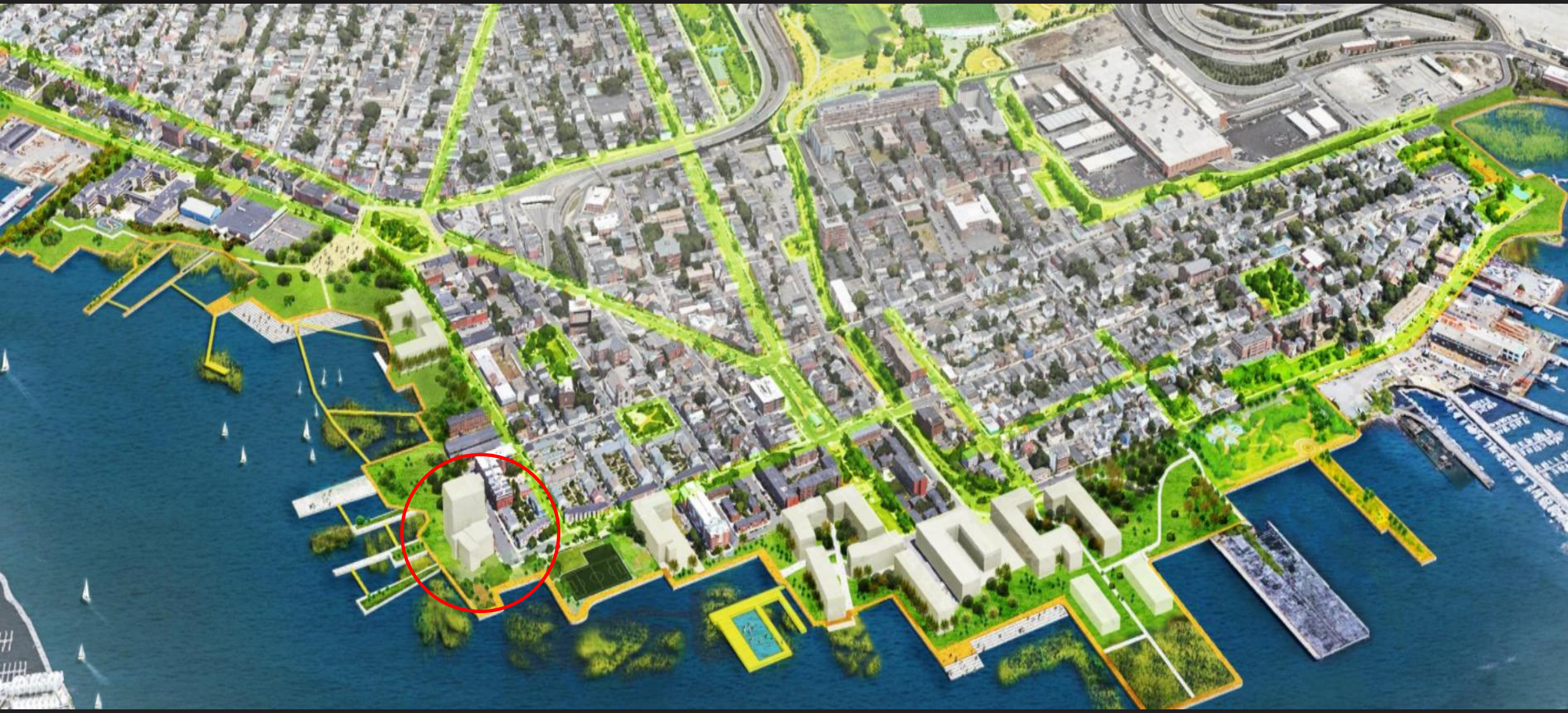
Climate Ready East Boston



Climate Ready East Boston



Climate Ready East Boston



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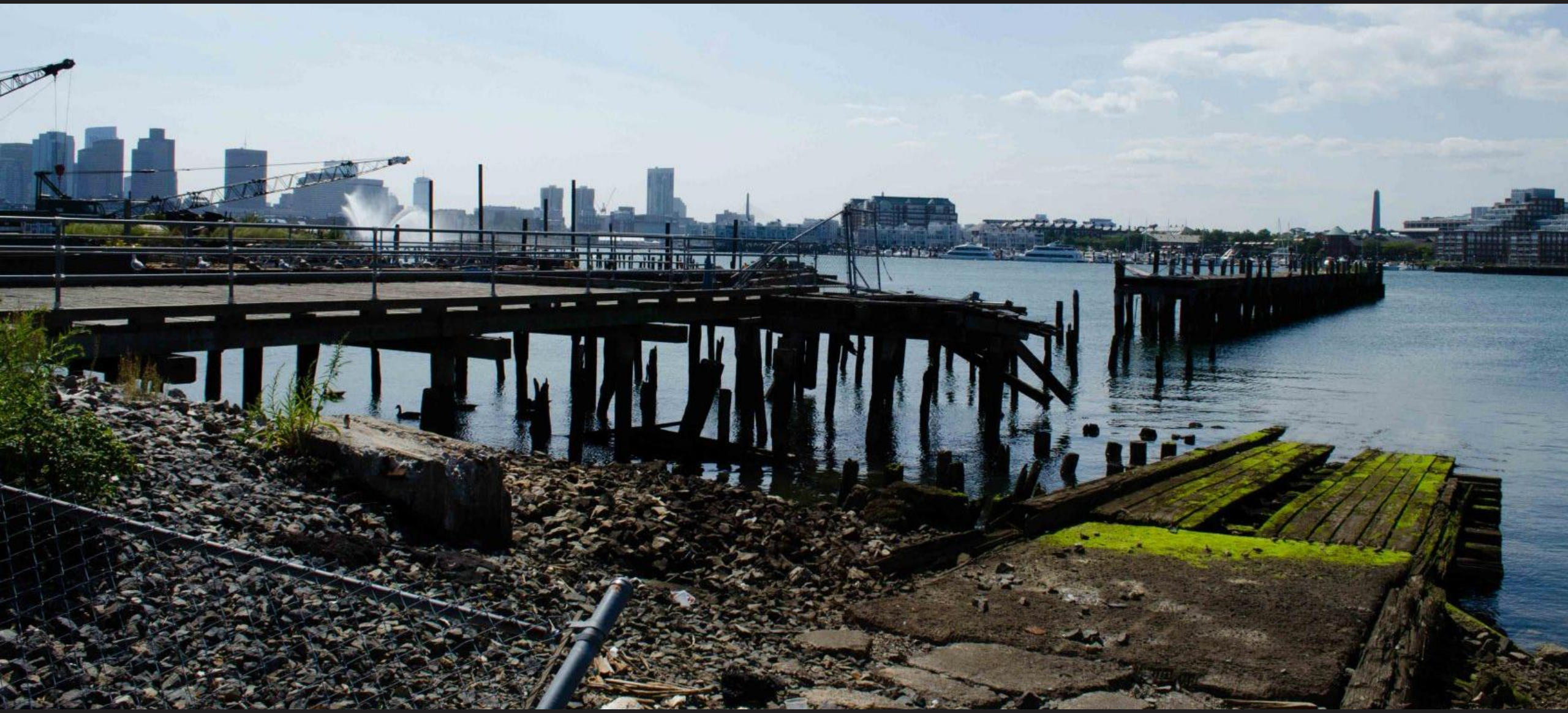
Project Brief

- Mixed-use Multifamily Residential
- Urban
- 257,500gsf
- 259 apartments (Studio, 1BR & 2BR)
- 5,000gsf retail
- $104million
- 4 acre brownfield site
- Enhanced green space
- Extension of water taxi network
- LEEDv2009 GOLD
- Designed-in 3-day “Bounce Back”

The Best View In Town…

Our Existing Site



And What Happens There

Subtle Shifts in Topography

Site Strategies

Cut and Fill

Grade Equipment & Access

Grade Shift

Maintain Public Access to the Water

Grade > 500-year Flood Plain

Grade > 500-year Flood Plain

Landscaped Barriers

3-Dimensional Green Space

Infrastructure as Public Amenity

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3-Dimensional – Accessible – Green Space

Planning Strategies

Connectivity - Harborwalk

Community

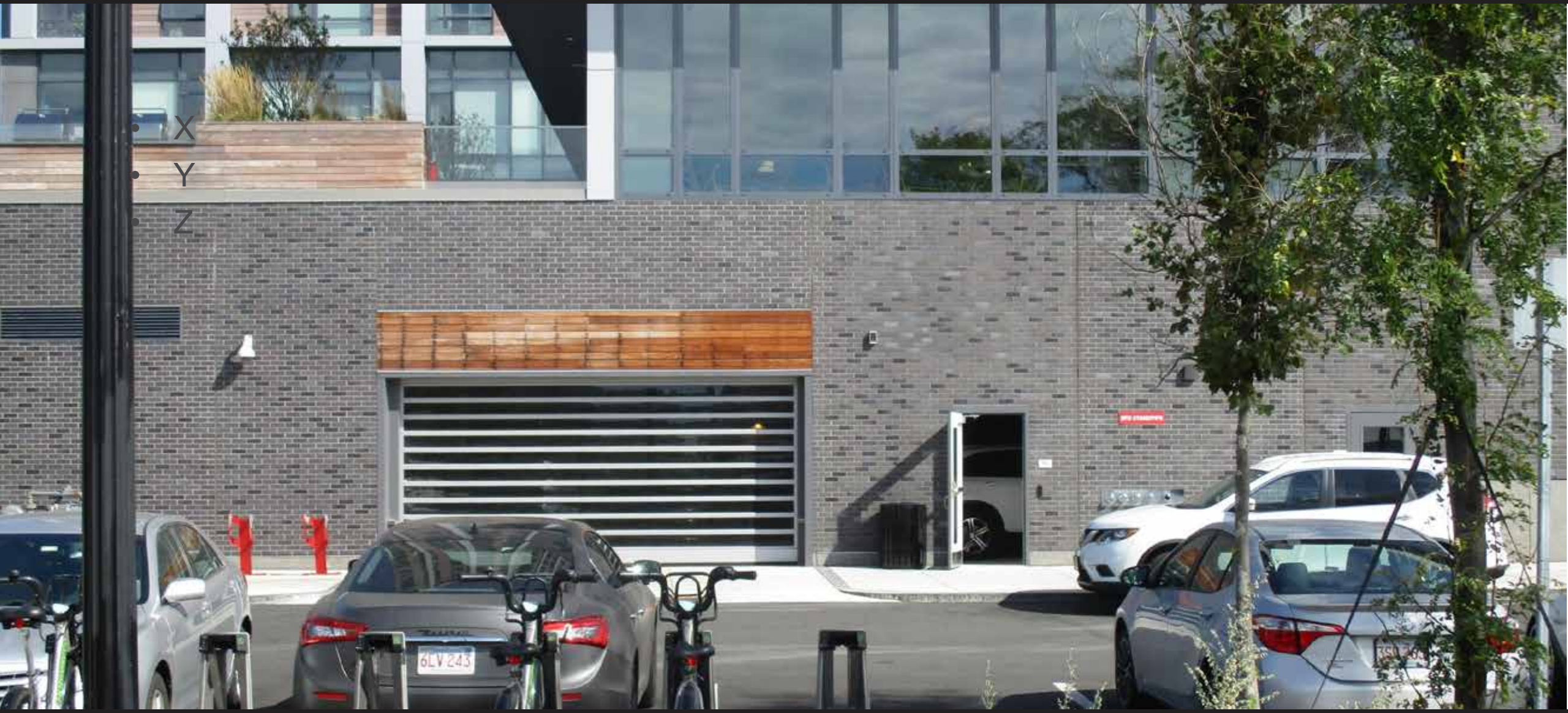
Community Space

Amenities

Enhanced Sea Wall

Enhanced Sea Wall

Space Planning Strategies



Amenities

Space Planning

Wet-floodproofing

Art

Active Strategies & Rooftop HVAC&R

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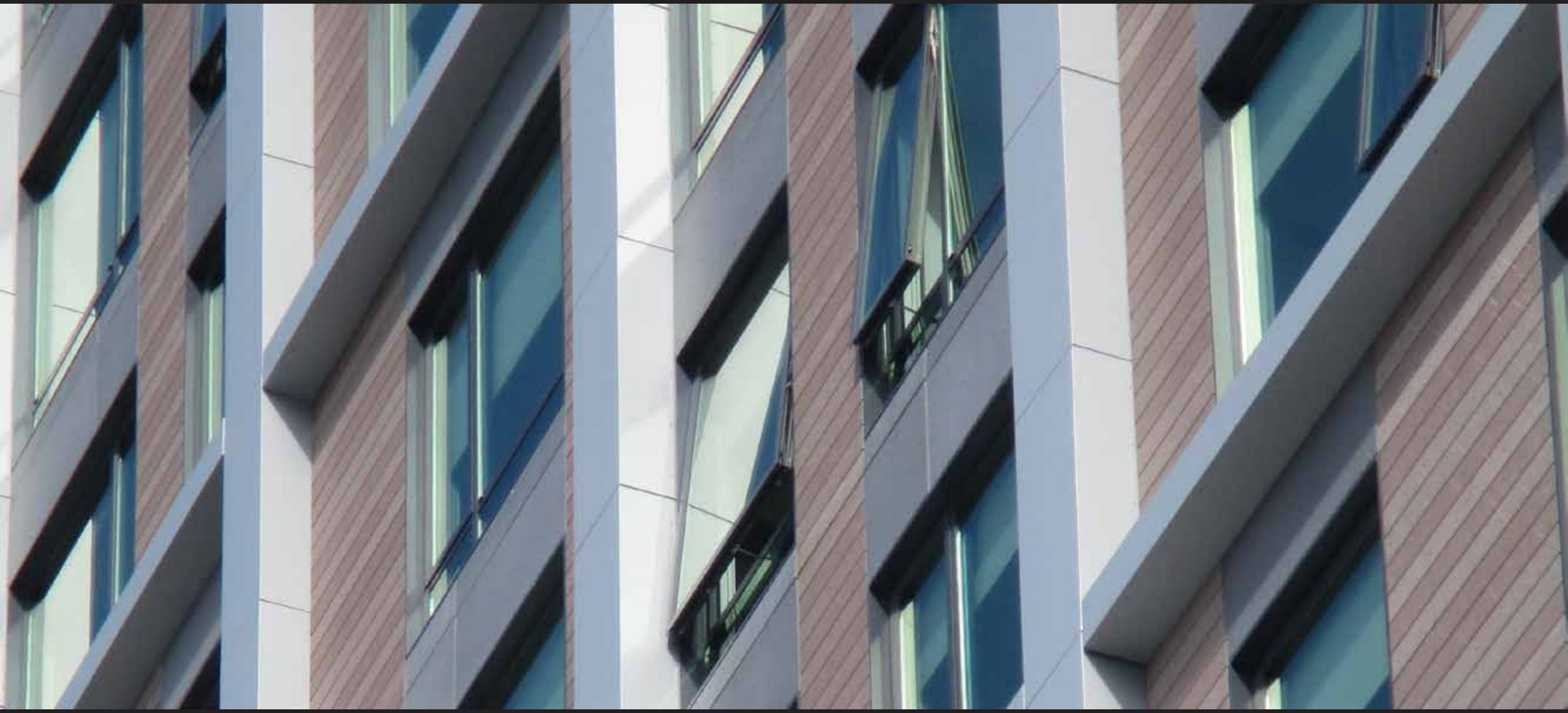
Durability

Passive Strategies



Daylight & Views

Summary of Strategies

- Elevated grade > 500-year floodplain
- Space planning to lift critical elements
- Wet-floodproofing
- Site amenities = barriers
- Site amenities = public, open green
- Enhanced sea wall
- Rooftop HVAC&R
- Passive strategies
- Biophilia and art
- Community access/landscaping
- Durable materials

Outcomes

- $150,000 annual energy savings
- 90% insurance premium reduction from $10million to $1million
- Top-of-market pricing (2-18%)
- Faster Leasing
- 60% renewal
- 95% occupancy
- Money saved up-front by recycling “dirty” soil onsite

Summary

- Vision & Tools Municipality-driven
- Community Engagement Critical
- Public/Private Partnerships
- Good Design Reduces Cost
- Resiliency = Amenity Opportunities
- Resiliency Exploits Vulnerability
- Resiliency = Place ≠ Fear
- Insurance Company Driven
- Resiliency Affords “Green” Features
- Resiliency Promotes Health & Wellness
- Buildings Are Not Islands

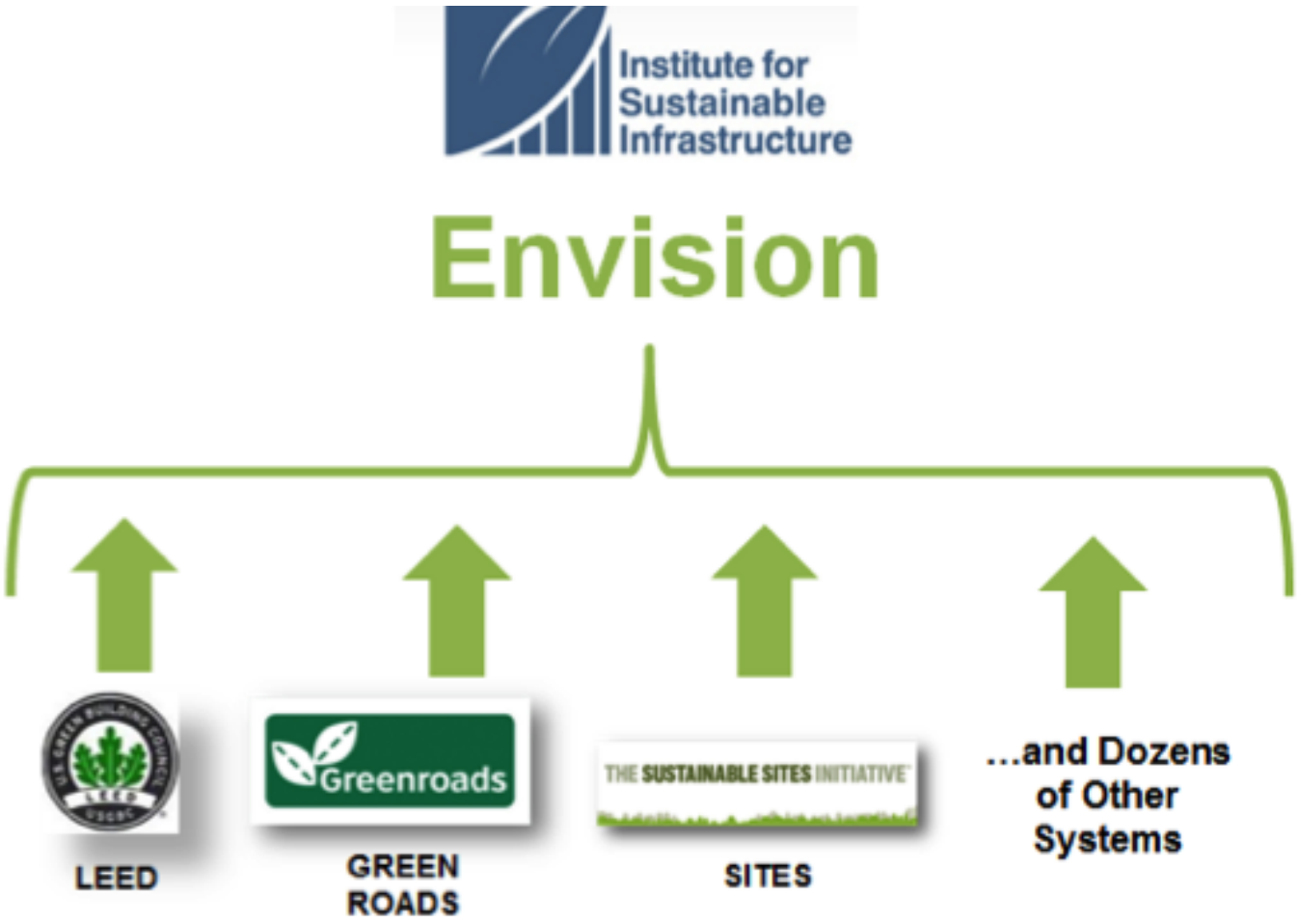
Main Takeaway

Resiliency is here to stay. This is a never-ending project. It's an urban project. Saving our cities is as big a project as building them. We have to find a way to adapt to the problem while making the problem work for us.

RELi

GBCI + RELi

Envision


Institute for Sustainable Infrastructure
Envision
LEED
Greenroads
GREEN ROADS
THE SUSTAINABLE SITES INITIATIVE
SITES
...and Dozens of Other Systems

!!!Thank You!!!

- Blake Jackson, AIA
- US Northeast – Sustainability Design Leader
- Stantec – Boston

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